DOCUMENT RESUME

ED 363 725 CE 064 952

AUTHOR Hoachlander, E. Gareth; Levesque, Karen A.
TITLE Improving National Data for Vocational Education: Strengthening a Multiform System.
INSTITUTION MPR Associates, Berkeley, CA.; National Center for Research in Vocational Education, Berkeley, CA.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE Nov 93
CONTRACT V051A30003-93A; V051A30004-93A
NOTE 194p.; Small print in some tables may not reproduce well.
AVAILABLE FROM NCRVE Materials Distribution Service, 46 Horrabin Hall, Western Illinois University, Macomb, IL 61455 (order no. MDS-767: $10.50).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC08 Plus Postage.
DESCRIPTORS Data Analysis; *Data Collection; Data Interpretation; Educational Research; *Information Needs; Management Information Systems; *National Surveys; Needs Assessment; Postsecondary Education; *Program Improvement; Questionnaires; Secondary Education; State Programs; *Vocational Education

ABSTRACT

A series of national meetings with a professional working group were held to discuss data issues, needs, and priorities in order to determine national data needs for vocational education. The study team gathered detailed information on current federal-level data collection efforts relevant to vocational education. Local and state data collection capacity and the extent of uniformity and comparability within and among states in data collection and reporting were assessed in case studies of six states. A comprehensive map of existing national data on vocational education was developed, and recommendations were formulated regarding designing a multiform vocational education data collection system that would maintain the distinction among the following four functions of national program data: (1) describe context and trends; (2) describe program practices; (3) monitor program compliance; and (4) monitor program performance. Other study recommendations included collecting data in the broader context of general education whenever possible, establishing a system for reviewing the vocational content of national surveys and studies, and integrating efforts to refine the existing vocational education data system with other national data-related activities. Appended are the data map, a summary of state management information system practices, and a list of professional working group meeting participants. (Contains 22 references.) (MN)

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IMPROVING NATIONAL DATA FOR VOCATIONAL EDUCATION: STRENGTHENING A MULTIFORM SYSTEM

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Supported by
The Office of Vocational and Adult Education,
U.S. Department of Education

November, 1993

MDS-767

CE 064 952

FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education
Grant Number:	V051A30004-93A/V051A30003-93A
Act under which Funds Administered:	Carl D. Perkins Vocational Education Act P. L. 98-524
Source of Grant:	Office of Vocational and Adult Education U.S. Department of Education Washington, DC 20202
Grantee:	The Regents of the University of California National Center for Research in Vocational Education 2150 Shattuck Avenue, Suite 1250 Berkeley, CA 94704
Director:	Charles S. Benson
Percent of Total Grant Financed by Federal Money:	100%
Dollar Amount of Federal Funds for Grant:	$6,000,000

Disclaimer:

This publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view of opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.

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ACKNOWLEDGMENTS

Many individuals made substantial contributions to this report. Participants in the Professional Working Group (PWG) and a series of national meetings offered their expertise in the areas of vocational education data collection practices and priorities, and PWG members provided valuable comments on the first draft of this report. Glenn Boerrigter and Mark Schwartz of the Office of Vocational and Adult Education, Jim Houser of the National Center for Education Statistics, Dave Boesel of the National Assessment of Vocational Education, and Jim Woods of the National Occupational Information Coordinating Committee reviewed the final draft of the report. State and local vocational educators in California, Colorado, Idaho, Kentucky, Michigan, and Rhode Island graciously offered their time to discuss vocational education data collection procedures in their states.

Without the assistance of several MPR Associates staff and consultants, this report would not have been published. Carolyn Arnold prepared the data map and contributed substantially to "Describing Context and Trends." John Tuma, Susie Kagehiro, and Jason Matlof helped conduct and summarize the findings for the state visits. Fran Christie and Brett Threlkeld edited the report, and Leslie Retallick prepared the summary charts. Finally, Melinda Hobbs and Ramona Fuller provided invaluable administrative support.

This publication is available from the:

National Center for Research in Vocational Education
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INTRODUCTION

Congress has a longstanding interest in data describing the status of secondary and postsecondary vocational education programs. Basic questions about the vocational education enterprise—how it is organized and governed, what is offered, who participates, what is accomplished, and what it costs—have dominated policy discussions at the local, state, and federal levels during the past thirty years. Accurate answers to these questions, however, have been difficult to obtain. Producing good national data on vocational education is an ongoing challenge.

On several occasions, therefore, Congress has asked for better data on vocational education. Most recently, in the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, Congress directed the Secretary of Education to establish a vocational education data system that, to the extent practicable, would use comparable information elements and uniform definitions to describe the condition of secondary and postsecondary vocational education. Generally, this system should support the overall purpose of federal vocational education policy: "improving educational programs leading to academic and occupational skill competencies needed to work in a technologically advanced society" (Section 2). Specifically, this system is to serve two primary functions: (1) provide Congress with information relevant to policymaking and (2) provide local, state, and federal agencies, as well as tribal agencies, with information relevant to program management, administration, and effectiveness of vocational education.

Additionally, Congress sought a system that would describe the major elements of the vocational education enterprise, including students, teachers, administrators, facilities, and equipment. This system should include information on the participation of members of special populations. At a minimum, such a system should produce national estimates and do so in the context of the larger secondary and postsecondary education systems.

In calling for a vocational education data "system," Congress was clear about its not expecting a new, independent system of collection that would be unique to vocational education. On the contrary, the law explicitly stated that the system should use, or modify as necessary, existing data collection systems operated by the U.S. Department of Education and other federal agencies. The law provided for collection of new data where

necessary, but it clearly stated that any new efforts should complement existing systems. Further, Congress asked that the Department of Education update the system at least every three years.

How might these requirements of the 1990 Perkins Act be satisfied? To answer that question, the Office of Vocational and Adult Education (OVAE) and the National Center for Education Statistics (NCES) contracted with the National Center for Research in Vocational Education (NCRVE) at the University of California at Berkeley to conduct a study of national data needs for vocational education. The study had as its primary purpose advising the Department of Education on the design of systems for collecting and reporting information on vocational education.

To that end, the study aimed (1) to identify and rank needs for national data on vocational education, (2) to examine current data collection activities and identify gaps in information on vocational education, (3) to examine conceptual and methodological issues complicating data collection, and (4) to assess the data collection and reporting capacities of local and state providers of vocational education. To meet these objectives, the study conducted three major activities. First, study staff held a series of national meetings with a Professional Working Group (PWG) and other interested parties to discuss data issues, needs, and priorities. Second, the study team assembled information on current data collection efforts relevant to vocational education. As a part of this activity, study staff reviewed in detail the vocational education data elements that are currently used by the Department of Education and other federal agencies in their national statistical surveys. This review led to a comprehensive map of existing national data on vocational education. Third, study staff conducted a series of brief case studies in each of six states. The study team visited local and state personnel in each of these states to assess local and state data collection capacity as well as the extent of uniformity and comparability within and among states in data collection and reporting.

This report sets forth the findings and recommendations of the study. This introductory chapter reviews the policy and program management questions that data must address, the different functions that data serves, the history of past efforts to collect information on vocational education, and the status of current data-collection strategies. "Describing Context and Trends" examines the kinds of data required to provide general contextual information about vocational education, as well as information about

important trends. "Describing Program Practices" discusses data requirements for describing program practices, including evaluating specific federal policy initiatives. "Monitoring Program Compliance" reviews the data required for monitoring compliance with federal regulations. "Monitoring Program Performance" looks at data requirements for monitoring program performance at the local and state levels and their relationship to federal data needs. The concluding chapter summarizes the study's findings and recommendations. Appendices include the data map, describe the results of the case studies, and list participants in the PWG and other national meetings.

Primary Questions

Typically, major policy and program management questions about vocational education seek information on seven different topics: (1) organization and governance, (2) student participation, (3) program offerings, (4) accomplishments, (5) personnel, (6) facilities and equipment, and (7) costs. To better understand the kind of data needed to address these questions, this introductory chapter begins by briefly examining some of the most frequently voiced concerns with respect to each of these topics.

Organization and Governance

Delivering vocational education is primarily the responsibility of local and state governments. Federal funds for vocational education constitute between five and ten percent of the total expenditures for vocational education. A few states provide categorical funding for vocational education, but most support vocational education through general state aid to secondary and postsecondary programs. Not surprisingly, therefore, there is considerable variation in the ways in which vocational education is organized and governed throughout the nation.

Vocational education is offered through both secondary and postsecondary institutions. Many states also offer courses in the middle school grades. Typically, these are courses in industrial arts (now called industrial technology or technology education in many places) and in home economics (also called consumer and homemaking education or life management). Such courses are also offered in most public high schools. At the secondary level, vocational education is primarily a public offering; few private schools offer vocational education, not even industrial arts or home economics. While the

arrangements differ somewhat from state to state, in all states, comprehensive high schools provide some vocational education programs.

Many states have also established systems of area vocational schools. Area schools operate under a joint services agreement established between two or more comprehensive high schools (usually including two or more school districts) or under the aegis of a separate county school district. In at least two states, New York and Colorado, area schools are operated by Boards of Cooperative Education Services (BOCES) and include special education services and other types of activities provided jointly by participating districts. California calls its area schools Regional Occupational Centers and also operates shared-time Regional Occupational Programs at some comprehensive high schools. As typically organized, area schools enroll high school students in advanced vocational education programs for part of the day. These students take academic classes and other electives in their home high school, which is also the locus for extracurricular activities.

Some school districts, mainly in large cities, also operate full-time vocational high schools. These schools offer the full spectrum of vocational and academic classes, often organized around particular clusters of occupations or a specific industry such as health, business, or aviation. Full-time vocational schools differ from comprehensive high schools in that all students are expected to participate fully in the vocational curriculum.

At the postsecondary level, both private and public institutions offer vocational education. Public two- to three-year institutions (community colleges) serve over half of the students enrolled in postsecondary vocational education programs. Some four-year institutions offer vocational education, primarily through associate degree programs. A few states operate vocational/technical institutes. These are nondegree-granting institutions providing vocational education programs of up to two years in length. In the private sector, both nonprofit and for-profit institutions offer postsecondary programs. Private, for-profit institutions (commonly called proprietary schools) provide a range of offerings, from relatively short-term programs in truck driving or bartending to two-year associate degree programs in business or health. There are a number of private, nonprofit, less-than-four-year institutions offering postsecondary vocational education; private, nonprofit nursing schools are a typical example of this type of institution. Area schools that serve high school students also provide programs for adults, usually in the

evenings. Some area schools intentionally mix adults and high school students during their regular daytime programs, since adults can provide good role models for high school students and can facilitate teaching.

In recent years, a number of states and local secondary and postsecondary school districts have been encouraging the development of Tech Prep or 2+2 programs. These programs span the last two years of high school and the first two years of postsecondary education. Some (sometimes called 2+2+2 programs) also lead to further postsecondary education at four-year colleges and universities. In some cases, Tech Prep programs are little more than simple articulation agreements between secondary and postsecondary districts. In others, they are sophisticated, jointly funded programs that allow high school students to receive both high school and college credit for classes they attend at community colleges.

While the framework of the secondary and postsecondary delivery system is generally well-understood, there is little accurate information on the numbers of different types of institutions offering vocational education in each of the states and territories. In general, better data exists about public institutions than about private institutions. However, information about public institutions is often incomplete and out of date. For example, there is no good, current information on the number of area vocational schools operating throughout the country. The Common Core of Data (CCD) purports to collect this information, but the data on area schools is inaccurate in several states.

The complexity of governance of secondary and postsecondary vocational education makes it difficult to obtain good information about institutions providing vocational education. Federal law requires the states to designate a single state agency as the responsible authority for vocational education. While all states do, the requirement masks a wide range of approaches among the states to governing the delivery of secondary and postsecondary vocational education.

Most states have created different governing boards for overseeing secondary and postsecondary education and even different governing boards for different systems of postsecondary education (e.g., a separate board each for community colleges, four-year state colleges, and universities). A few states have a separate state board for vocational education that operates independently from the secondary and postsecondary boards.

Responsibility for area schools or vocational/technical institutes may lie with entities other than the state board of education or the postsecondary board of governors overseeing community colleges.

For private institutions, of course, there is usually no umbrella state agency with oversight responsibilities. A few national associations exist to represent the public policy interests of different types of private educational institutions, but the institutions themselves operate with high degrees of autonomy.

These various governance arrangements complicate collecting information about vocational education. There is no single, identical entity in all states with responsibility for vocational education. Consequently, it is not always apparent to whom requests for information should be directed. The problem is compounded by the lack of a current, complete map of the kinds of governance arrangements for vocational education among the states and territories.

A first step in improving national data about vocational education, therefore, is to develop a better picture of the various systems for overseeing public and private vocational education and the structure of the delivery system in each state. How is vocational education governed, and how many of the different types of secondary and postsecondary institutions offer vocational programs? A better understanding of organization and governance would not only direct national data collection efforts to appropriate sources of information about secondary and postsecondary vocational education, it would also help federal administrators and policymakers communicate better with local and state vocational educators. These organizational complexities, however, are not limited to vocational education. Data and policy on all secondary and postsecondary education might be improved by closer attention to issues of general education governance and organization in the states and territories.

Student Participation

Who participates in vocational education? Policymakers at all levels frequently ask this question. They want to know patterns of participation by race/ethnicity, gender, and various types of special needs. Special needs populations almost always include students with disabilities, economic or academic disadvantages, or limited-English proficiency. Additionally, federal policymakers have been interested in improving access

to vocational education for single parents, displaced homemakers, criminal offenders, adults in need of retraining, and individuals who participate in programs designed to eliminate sex bias.

The question "Who participates in vocational education?" is often confused with the question "Who is a vocational student?" The two questions are quite different, and the first is much easier to answer than the second. At both the secondary and postsecondary levels, there is usually a well-defined vocational education curriculum, and identifying participants in this curriculum is relatively straightforward. However, if mere participation is synonymous with being a vocational education student, then almost all high school students and a very large percentage of students in less-than-four-year postsecondary institutions are vocational students. Among 1987 high school seniors, 98% had taken at least one or more courses in vocational education during their high school careers; 79% of 1980 high school seniors enrolled in public two-year postsecondary institutions had taken at least one course in the vocational curriculum (Hoachlander, Kaufman, & Levesque, 1992).

Implicit in the question "Who is a vocational student?" is some notion of concentration or specialization in the vocational curriculum. There are, however, no standards, either nationally or in most states, for what constitutes sufficient concentration or specialization for a student to count as a vocational student. Moreover, even if such standards existed, they could only be applied retrospectively to data accumulated over several years. For example, how would one know whether a high school freshman enrolled in Agriculture I counted as a vocational student? The student may go on to concentrate in an agriculture program or may never take another vocational course. If concentration and specialization are the criteria for determining who is appropriately labeled a vocational student, such a determination can only be made after students have completed their secondary or postsecondary careers.

Consequently, one must question the utility of the very notion of a vocational student. What purpose is served by seeking to label some students vocational? The extent of participation defines, at least in part, the scope of the vocational education enterprise. Where there are well-articulated standards for what constitutes program completion such as acquisition of the necessary occupational and academic skills needed to succeed in the labor market, counting the number of vocational completers has value.

It is also useful to examine how different levels of participation in the vocational education curriculum are related to the mastery of occupational and academic skills. All of these issues, however, can be addressed by monitoring program participation and do not require an arbitrary definition of "vocational student."

In the absence of a clear rationale, therefore, it is probably wise to drop the notion of "vocational student" from the policy lexicon and concentrate instead on measuring program participation and the number of program completers. Participation, of course, needs to be monitored by race/ethnicity, gender, and a variety of special needs.

Program Offerings

Under the 1990 Perkins Act, the term "vocational education" means

> organized educational programs offering a sequence of courses which are directly related to the preparation of individuals in paid or unpaid employment in current or emerging occupations requiring other than a baccalaureate or advanced degree. Such programs shall include competency-based applied learning which contributes to an individual's academic knowledge, higher-order reasoning, and problem-solving skills, work attitudes, general employability skills, and the occupational-specific skills necessary for economic independence as a productive and contributing member of society. Such term also includes applied technology education. (Section 521)

Vocational education programs, therefore, can include—and indeed federal policy now encourages them to include—academic as well as vocational courses. Moreover, federal policy intends that vocational education emphasize and contribute to the acquisition of academic knowledge and skills in addition to occupational competencies. This direction represents an important departure from past conceptions of vocational education, which stressed occupationally specific skills.

At the secondary level, the vocational curriculum has traditionally been organized under nine different program areas:

1. Consumer and homemaking education (sometimes called home economics and now increasingly referred to as life management)
2. Industrial arts (increasingly called industrial technology or technology education)
3. Agriculture
4. Business

5. Marketing and distribution
6. Health
7. Occupational home economics
8. Trade and industry
9. Technical education

Of the nine programs, seven (excluding [1] consumer and homemaking education and [2] industrial arts) are often referred to as occupationally specific programs or programs providing "specific labor market preparation" (Choy & Horn, 1992; Gifford, Hoachlander, & Tuma, 1989). Postsecondary offerings are similar and also exclude consumer and homemaking education and industrial arts.

Policymakers generally ask two kinds of questions about program offerings: (1) What programs are offered, and (2) How much vocational education do students take? Related questions concern the quality of these offerings, especially the extent to which they meet the needs of current and future labor markets and enhance American competitiveness and productivity.

What Programs Are Offered?

At the national level, the Classification of Instructional Programs (CIP) has been the primary system used by the Department of Education to describe vocational education offerings (Morgan, Hunt, & Carpenter, 1991). At its most general level, the CIP assigns two-digit codes to the nine major divisions of vocational education. Health professions and related sciences programs, for example, all have the two-digit code 51. In some cases, more than one two-digit code comprises a vocational program area. For example, trade and industry programs include codes 46, 47, 48, and 49, encompassing construction trades, mechanics and repairers, precision production trades, and transportation and materials moving workers programs, respectively. Within each of these major occupational areas, CIP uses an additional two digits to define more specific programs. In health, for example, the code 51.08 defines programs in the health and medical assistants area. An additional two digits further identifies programs within the four-digit program area. The code 51.0802, for example, stands for a program training students for the occupation of medical laboratory assistant. In summary, therefore, it is possible to describe program offerings at the two-, four-, and six-digit levels.

In all, there are seventeen two-digit codes describing the seven occupationally specific programs. Within these seventeen areas, there are approximately 120 different four-digit vocational education programs. At the six-digit level, there are over 550 individual vocational education programs covering such diverse subjects as soil and water mechanical practices, business data entry equipment operation, fashion merchandising, respiratory therapy technology, custom tailoring and alteration, electromechanical technology, and cooling and refrigeration.

How much programmatic detail is necessary in reporting data for public policy, especially at the national level? The answer depends, in large part, on whether one is interested in program enrollment or program completion. At both the secondary and postsecondary level, students enroll in courses, not in programs. While a particular course can usually be identified with one of the major two-digit program areas, quite often it will be part of two or more programs at the four- or six-digit level. A student enrolled in Accounting I, for example, could be pursuing any one of six or seven four-digit business programs. It is often not possible, therefore, to report accurately enrollment below the two-digit program level. However, when a degree or certificate is awarded upon completion of a program, identifying the program at either the four- or six-digit level poses no particular problems. Because completion represents (or at least should represent) readiness to work in a related occupation, completion information at the four- or six-digit level is useful for assessing labor market supply. Consequently, if gathering programmatic detail is required by policy concerns, it should focus on program completion rather than program enrollment.

How Much Vocational Education Do Students Take?

While indicators of the amount of activity in vocational education, enrollment and completion data do not provide an accurate picture of the magnitude of the enterprise. Assessing the level of effort students expend in vocational education requires additional measures. At the secondary level, the Carnegie unit is the common measure of the amount of vocational education taken by students. A Carnegie unit is the equivalent of taking one 45- to 55-minute course five days a week for about 180 days a year (or the length of the academic year). At the postsecondary level, semester credits or quarter credits are the most frequently used measures. At both levels, measures of contact hours or full-time equivalents (FTE) sometimes replace Carnegie units or credits. In some instances, such as in many postsecondary proprietary schools, there is no common metric,

and it is possible only to measure the number of courses taken. Efforts to collect information about the amount of vocational education taken by students (e.g., through transcript studies, for example) must struggle with procedures for converting these different methods for measuring class time into a single, common measure. Doing so successfully, of course, depends first on knowing what unit is being used by the reporting institution, not always an easy requirement to satisfy for students whose educational careers span two or more institutions using different systems.

At the secondary level, transcript studies now provide accurate information on the number of Carnegie units students accumulate in vocational education. Depending on the sample size of these studies, this information can be reported by a two-, four-, or six-digit program area. As a general rule, however, it is difficult to obtain from transcript studies information for more than about thirty to fifty individual vocational education programs. More detail would require very costly increases in sample sizes.

Carnegie units and credits mainly measure seat time. They are not direct measures of learning. Hence, there is a growing interest in other ways of assessing what is accomplished in vocational education, our next subject.

Accomplishments

In trying to gauge the effectiveness of vocational education, policymakers traditionally have focused on labor market outcomes. Measures such as placement rates, time to employment, earnings, time employed, and employer satisfaction have been used to assess how well vocational education serves the employment needs of business and industry as well as the career aspirations of program participants.

Recently, policymakers have expressed a growing interest in the learning outcomes of vocational education. How well does vocational education contribute to the mastery of academic skills and students' abilities to apply these skills in work settings? Do students acquire the appropriate occupational competencies for performing on the job? The 1990 Perkins Act encourages vocational educators to pay more attention to teaching "all aspects of the industry." This prescription seeks to expand the focus of vocational education beyond narrow, job-specific skills to more generic knowledge about an industry's history, financial underpinnings, labor composition, technology, and place in domestic and world markets.

Assessing accomplishments by measuring either traditional labor market outcomes or less conventional learning outcomes, poses many challenges. Local and state follow-up of labor market outcomes and other types of post-program completion consequences (e.g., enlistment in the military or pursuit of further education or training) have been plagued by short follow-up timelines and low response rates. National longitudinal studies have usually overcome these shortcomings, but limited sample size has often severely constrained analyses of program effectiveness. To date, evaluating learning outcomes has been forced to rely mainly on standardized achievement tests that were not designed with vocational issues in mind and that do not lend themselves to assessing workplace applications of academic skills. Several promising efforts to design alternative forms of assessment such as performance assessment and portfolios are underway but still several years from acceptable validity and reliability and widespread application.

The nature of testing also differs markedly between secondary and postsecondary institutions. Universal, uniform standardized tests are much more common at the secondary than at the postsecondary level. Similarly, statewide curriculum and curriculum standards are more prevalent among secondary than postsecondary systems. Consequently, uniform evaluation of learning outcomes is more problematic for postsecondary vocational education programs.

Personnel

Policymakers have also asked questions about the characteristics of faculty and administrators responsible for delivering vocational education programs. What is the distribution of vocational education personnel at the secondary and postsecondary levels by race/ethnicity, gender, and age? What qualifications do they possess, and how much experience in education have they developed? Do they have clear connections to the industries for which they prepare students, and do they have current knowledge of industry-specific technology and labor skill requirements?

Closely related to these questions are concerns about the adequacy of teacher training institutions, the fit between supply and demand for vocational educators, and leadership development. What institutions train vocational faculty? What kinds of programs do they offer prospective teachers? Are these in keeping with present and

future expectations about the kinds of knowledge, skills, and abilities students will need to succeed in particular industries and occupations?

Data on both secondary and postsecondary vocational faculty is now available from periodic surveys conducted by NCES. Relatively few secondary or postsecondary faculty teach both vocational education and academic subjects, so it is easy to isolate vocational faculty and describe their characteristics.

Facilities and Equipment

Policymakers and program managers have also asked questions about the facilities and equipment used for vocational education. Are facilities and equipment adequate? Are they under- or over-utilized? Are they in good condition? Are they adequate for serving physically handicapped students? Does the equipment used reflect the state of the art in the industry?

Little data on vocational facilities and equipment is readily available. The last comprehensive study of facilities was completed in 1978 and did not include a study of equipment (Woodruff, 1978). While providing some information, current statistical surveys do not include a systematic overview of facilities or inventory of equipment. Although local providers of vocational education keep records of equipment purchased with federal funds, this information is not routinely gathered and provides only a partial picture of equipment used for vocational education.

Costs

Funding for secondary and postsecondary vocational education is largely the responsibility of local and state governments, with federal dollars representing a relatively small fraction of total spending for vocational education. Precisely what fraction federal dollars constitute is difficult to determine. Most states and local accounting systems track expenditures by object—salaries, benefits, supplies, equipment, travel, and so on—not by program. Most secondary and postsecondary systems can no more tell what they spend for vocational education than they can for math, English, science, or social studies.

Nevertheless, using information on FTE faculty or student contact hours in vocational education, it is possible to estimate total expenditures for vocational education. Best estimates of the percentage of total spending for vocational education accounted for by federal dollars have been in the range of five to ten percent. In recent years, the percentage has almost certainly been declining as the amount of federal spending has remained about constant and state and local spending for education has increased.

Tracing the distribution of federal funds for vocational education poses no particular problems. States routinely keep track of allocations of Perkins funds to eligible recipients, and the information is reported annually to the federal government. Similarly, local recipients keep good records on uses of federal funds. Although local recipients are not required to report data on the uses of funds to Washington, the information is readily available for periodic special studies conducted by OVAE or as part of the National Assessment of Vocational Education (NAVE). At the postsecondary level, probably the greatest federal support for vocational education comes not from the Perkins Act, but from the various federal student aid programs that make loans and grants, which include the costs of tuition.

Obtaining precise estimates of local and state expenditures for vocational education is more problematic, although a growing number of local recipients are beginning to maintain program budgets and accounting systems. A few states provide categorical assistance for vocational education, but most provide state support for vocational education indirectly through general purpose state aid, which local districts and institutions are free to spend as they wish. Similarly, local support for vocational education usually comes from general purpose property tax revenues rather than from levies earmarked for vocational education. In the absence of program budgets, therefore, it is impossible to obtain precise estimates of local and state expenditures for vocational education in any kind of inexpensive, routine fashion. Special studies are required.

In summary, the most frequently asked questions about vocational education can be organized into these six major topics: (1) organization and governance, (2) student participation, (3) program offerings, (4) accomplishments, (5) personnel, and (6) costs. Data for each of these areas will be shaped by the specific functions the information serves. Assessing national data needs for vocational education, therefore, depends on a

clear understanding of the various functions related to the policy and program management concerns that vocational education data is expected to address.

Functions of National Data on Vocational Education

As directed by the 1990 Perkins Act, a national vocational education data system should provide Congress with information relevant to policymaking and tribal, local, state, and federal agencies with information relevant to program management. In order to meet these needs, national data must address four subsidiary functions: (1) describing the general context and trends related to vocational education; (2) describing program practices, including evaluating specific federal policy initiatives; (3) monitoring compliance with federal legislation; and (4) monitoring program performance. These four functions are not mutually exclusive. Data that serves one function can be useful in another, and data collected for all four functions can be used to establish federal policy and to manage programs. Nevertheless, the four functions are sufficiently distinct, so one must guard against the temptation to design a single system that will simultaneously meet the requirements of all four. The distinct requirements of these functions argue for a multiform system of vocational education data collection rather than a single, overarching design that will address all concerns.

To illustrate, Congress has an ongoing, long-term interest in monitoring participation in vocational education by different subgroups of secondary and postsecondary students. Race/ethnicity and gender, for example, are two student demographic variables that have been the focus of national policy for some time. Most ongoing efforts to collect data on participation in vocational education curricula, as well as in academic curricula, routinely include such demographic variables. Hence, with these data collections, it is possible to monitor over extended periods of time trends and changes in students' patterns of participation in vocational education.

A dataset well-suited for addressing ongoing interests, however, often will not help to assess more specific concerns that may be novel or short-term in interest. For example, it is not likely that the National Education Longitudinal Study (NELS:88) which follows a cohort of eighth graders beginning in 1988 will be very useful for evaluating the effectiveness of Tech Prep programs. NELS and other similar datasets, of course, can

play an important role in special, short-term evaluations. They can, for example, provide good information on the population at large against which the results of specially targeted data collection can be evaluated. These ongoing national data sources, however, are not sufficient sources of information for addressing most objectives of specific, short-term evaluations of new policy initiatives. NELS:88 was designed, baseline questionnaires developed, and samples drawn well before Tech Prep became a focus of federal policy in 1990. While NELS:88 will provide excellent data on overall participation in vocational education, it will not permit much analysis of participation in Tech Prep. The evaluation of Tech Prep programs will require a separate, perhaps one-time study, with a data collection strategy designed specifically for that purpose.

Similarly, accounting for the distribution of federal funds for Tech Prep programs will require information on the universe of recipients of federal funds for Tech Prep. The data collection design for an evaluation of Tech Prep will fall far short of the coverage needed for accountability of funds for Tech Prep. A separate, albeit more limited, data gathering effort is necessary to satisfy these compliance concerns.

Finally, data useful for monitoring the performance of Tech Prep programs will be somewhat different from that required for the other three functions. Assuming program improvement is ultimately a local responsibility, data useful for monitoring program performance may need to reflect local needs and circumstances. Thus, while uniformity and comparability across localities and states may be desirable for general national policymaking and more specific policy evaluation, data for local program improvement may be useful only to the extent that they are not uniform and comparable. Data for monitoring program performance, therefore, will often require yet another approach to system design and data collection.

In short, meeting multiple policy and program management objectives usually requires multiple instruments. This rule applies as much to the design of data systems as it does to the development of particular policy and program strategies. Design of a national vocational education data system needs to keep these various functions in mind and tailor systems accordingly. The "Describing Context and Trends," "Describing Program Practices," "Monitoring Program Compliance," and "Monitoring Program Performance" sections offer some general guidelines for collecting data that serve each function as well as describe current data collection efforts and identify gaps in

information needed to address the seven primary policy and program management questions.

The more varied and distinct the functions of national data become, the less likely a single data system will be able to serve these many objectives. Multiple systems will be required. Unfortunately, this requirement has not been well-understood in past efforts to collect national data on vocational education. As the following discussion elaborates, the history of gathering national data on vocational education is replete with miscues that have severely undermined the value of the information collected.

History of Collecting National Vocational Education Data[1]

Since the passage of the Smith Hughes Act in 1917, the federal government has collected statistics in some form on vocational education. Until 1963, these amounted only to gross counts of students enrolled in the major program areas supported by federal aid: agriculture, business, trade and industry, and so on. The Vocational Education Act of 1963 and the 1968 Amendments began requiring a series of annual reports that contained more detailed reporting. In addition to enrollment in major program areas, states were asked to report information on total vocational education enrollment by race. They were also asked for information on enrollment of disadvantaged and handicapped students; enrollments in secondary, postsecondary, and adult vocational education programs; and expenditures from federal allocations as well as local and state expenditures for vocational education.

Responsibility for collecting these data lay with the Bureau of Occupational and Adult Education (BOAE) in the then U.S. Office of Education. Although many states used some of their federal vocational education research funds to develop new automated information systems, little uniformity existed across states. Problems with inaccurate, inconsistent data persisted throughout the 1960s, and Congress frequently complained about the quality of information on vocational education.

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[1] This section is taken from E. Gareth Hoachlander's (1989) *National Data Needs for Vocational Education*.

Project Baseline

To help address this problem, Congress established Project Baseline in 1970, a joint effort of the National Advisory Council on Vocational Education and the U.S. Office of Education. In Project Baseline's own words, the project "was established to get the information everyone needs and no one seems to have" (Lee, 1972). Baseline attempted to work with each of the states to develop a more complete and more reliable national picture of secondary and postsecondary vocational education.

Despite five years of effort, Project Baseline was unable to overcome most of the problems that had plagued the collection of vocational education data throughout the 1960s. Enrollment data still fluctuated wildly from year to year. Follow-up information was either unavailable or based on such small response rates that the data was useless. For example, in 1972, twelve states reported secondary enrollment in vocational education that was more than twenty percent greater than enrollment in 1971. Thirteen states in 1973 and 1974, fourteen states in 1975, and seven states in 1976 reported secondary enrollment increases of more than twenty percent from the previous year. During the period 1971 to 1976, from twelve to twenty-four states regularly reported annual data on the number of program completers that represented increases of more than twenty percent over the previous year (Benson, Hoachlander, & Johnson, 1980). While general secondary enrollment was still growing modestly in the early 1970s, the growth was not large enough to make credible changes of more than twenty percent in vocational education enrollments.

To its credit, Project Baseline did not mindlessly report these large fluctuations. Baseline sought explanations from the states; and in most instances, there were good reasons for the annual differences: new definitions, alterations in reporting systems, duplicative counting, late reporting, and missing data were but a few of the causes of inconsistent reporting over time. However, while Project Baseline could explain the problems, it could not correct them. The sorry state of vocational education data was left unchanged, and Project Baseline ceased collecting data after 1976.

The Vocational Education Data System (VEDS)

In 1976, Congress decided to move primary responsibility for vocational education data collection out of BOAE and lodge it with NCES. As NCES was the primary repository for educational data and had the expertise to oversee the design and

implementation of large scale data collection efforts, Congress hoped that NCES would produce more reliable information on vocational education. Thus, the 1976 Amendments to the Vocational Education Act directed NCES to design and operate a VEDS. Congress wanted VEDS to supply annual information on vocational education students, programs, program outcomes, staff, facilities, and expenditures. Congressman Carl Perkins (1981) summarized the general purpose of VEDS in his opening remarks on VEDS during hearings on December 10, 1981: "In mandating this system, Congress was responding to a lack of adequate data to judge program effectiveness and to make important decisions about future directions."

After almost two years in the design stages, VEDS began collecting data in 1978–1979. No one knows how much VEDS cost—some estimates were as high as $200 million when the resources expended by local and state personnel were counted—but by 1983, despite extraordinary efforts and expense, the realization was growing that the latest attempt to improve vocational education data had failed. In 1983, NCES performed a number of validity tests on the four years of accumulated data. These checks confirmed what many critics of VEDS had argued from the outset, that three major problems plagued the system:

1. *Lack of comparability among states.* Data was not comparable from state to state and, therefore, yielded misleading national totals when aggregated.

2. *Year-to-year variability.* The data exhibited excessive variation over time, which was difficult to explain. Consequently, the VEDS data could not be used to describe trends over time accurately.

3. *Within-state discrepancies.* When VEDS data from some states were compared to state data from other sources, many large discrepancies were observed; these could not be adequately explained.

Following these findings by NCES, the Office of Management and Budget (OMB) withdrew approval in December 1983 for collecting VEDS data for 1983-1984 and 1984-1985, because "VEDS has substantial and continuing problems collecting data which are accurate and meaningful." In a memo, the OMB (1983) directed that the "collection should not be undertaken at this juncture and should remain suspended until the Department [of Education] has fully implemented the plan for improving VEDS."

Improving VEDS, however, proved impossible. Although some parts of the system probably did produce reasonably accurate information, the widely circulated

horror stories (more Native American secondary students enrolled in vocational education in one state than the state's total population of Native Americans) subjected VEDS to such ridicule that there was little hope of salvaging any credibility for an improved system. In February 1984, the NCES Administrator, with the concurrence of OVAE (formerly BOAE), issued the following statement in a memo to the Secretary of Education:

> The current [VEDS] system has serious technical problems. NCES believes that the technical problems do not lend themselves to correction without a major system redesign. The data are unreliable and subject to serious misinterpretation.

Consequently, VEDS was permanently terminated, and another major effort to produce accurate, reliable national data about vocational education had failed.[2]

Despite the termination of VEDS nationally, many states have continued to operate modified versions of VEDS for their own purposes. While unable to achieve the uniformity and comparability necessary in a national data system, VEDS did succeed in stimulating states to pay more attention to vocational education data and develop systems that better met local and state policy concerns.

Data Collection Under the Carl D. Perkins Vocational Education Act of 1984

In fall of 1984, Congress tried once again. The Carl D. Perkins Vocational Education Act of 1984 directed NCES to develop "a national vocational education data reporting and accounting system using uniform definitions. The system required by this section was to include the following information on vocational education:

- Students (including information concerning race, sex, and handicapping condition)
- Programs
- Program completers and leavers
- Placement and follow-up
- Staff

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[2] For an excellent analysis of the problems inherent in the design and implementation of VEDS, see Barnes, 1984.

- Facilities
- Expenditures in relation to the principal purposes of this Act (Section 421)

This data collection mandate, however, differed from VEDS in one very important respect: NCES was to rely on sample surveys rather than a universal census. Furthermore, the information would be updated every other year rather than annually. There was one major exception to the use of sample surveys. Section 423 directed NCES to collect information on all secondary handicapped students enrolled in vocational education and to report this information by four-digit CIP code, instructional setting, and handicapping condition.

The 1984 Perkins Act also continued the National Occupational Information Coordinating Committee (NOICC) and charged it with assisting states in developing and implementing state occupational information systems to meet the needs of both vocational education and employment training programs. The primary objective of these systems is gathering information on labor market supply and demand and making the information accessible to a variety of users.

Efforts to comply with these directives on data collection proceeded much more cautiously than the earlier attempt with VEDS. Rather than develop an independent system for vocational education data collection, NCES relied on a strategy that emphasized using a variety of existing data collection efforts and, when necessary, modifying them to obtain better information on vocational education. Thus, requests for data on vocational education would be embedded in ongoing studies of the larger secondary and postsecondary education enterprises. These studies included the National Longitudinal Study of the Senior Class of 1972 (NLS–72), High School and Beyond (HS&B), and NELS:88. NLS–72 and HS&B figured prominently in the analyses undertaken by the first NAVE, the assessment required of the Department of Education by the 1984 Perkins Act (Section 403a). Additionally, NAVE, in cooperation with the Office of Special Education and Rehabilitation Services (OSERS) and NCES, led an effort to use the National Assessment of Educational Progress (NAEP) to collect recent secondary school transcripts to analyze participation patterns in secondary vocational education.

Special attention was paid to using this NAEP supplement to develop information on the coursetaking patterns of handicapped students. Although the 1984 Perkins Act directed NCES to collect information on all handicapped students, NCES maintained that this request was unworkable. Section 423 would simply have forced NCES to repeat the VEDS fiasco, albeit limited only to handicapped students. In contrast, the NAEP transcript supplement, while limited to a national sample of handicapped students, yielded for the first time a rich database on the participation patterns of handicapped students in all aspects of the secondary school curriculum, vocational as well as academic, by instructional setting and handicapping condition.

Additional information on secondary vocational education has since become available from the Schools and Staffing Survey, which was conducted by NCES during the 1987-1988 school year. NELS:88, the most recent longitudinal study undertaken by NCES, is also providing a longitudinal portrait of participation in vocational education beginning with the eighth grade.

At the postsecondary level, NCES has sought to revamp the Higher Education General Information System (HEGIS) to include the full array of institutions offering vocational education outside of high schools. This revised data collection, called the Integrated Postsecondary Education System (IPEDS), replaced HEGIS and has become a major source of data on postsecondary vocational education enrollment and completion as well as postsecondary staffing, finances, and institutional characteristics. In many respects, IPEDS retains many of the assumptions and approaches to data collection that proved ineffective in VEDS. While a thorough assessment of the quality of data on vocational education generated by IPEDS is beyond the scope of this study, there are indications that the IPEDS data on enrollment suffers from the same problems of consistency and comparability that plagued VEDS. These problems will need further investigation.

Additionally, the postsecondary transcripts collected for NLS–72 and HS&B provide a wealth of data on postsecondary coursetaking patterns in vocational education. Finally, the National Postsecondary Student Aid Survey (NPSAS) made data on financial assistance available on postsecondary students participating in vocational education in the full array of postsecondary institutions, including proprietary schools.

NLS–72 and HS&B, as well as NLS Youth—the longitudinal study maintained by the U.S. Department of Labor—have also proven to be excellent sources of data for analyzing labor market outcomes associated with participation in vocational education. Not only do these studies overcome the problem of poor response rates, but they also permit tracking the labor market experiences of participants over much longer periods of time.

Data Collection Required by the Carl D. Perkins Applied Technology Education Act of 1990

As noted at the outset, the 1990 Perkins Act directs the Secretary of Education to establish a vocational education data system. It should be apparent, however, that a system of sorts, or at least major parts of a system, is already in place. Much of what Congress requested in the 1990 Perkins Act is available in more useful, accurate, and consistent forms than ever before. Moreover, the 1990 Perkins Act reestablishes the NAVE and requires a number of special studies by the General Accounting Office, Planning and Evaluation Services, and OVAE.

In sum, the history of congressional mandates to collect vocational education data is a series of attempts that has assumed that uniformity can be obtained from an enterprise that is extraordinarily diverse. Moreover, legislation has not been adequately sensitive to how vocational education interacts with the rest of the education system and to the implications of these interactions for data collection. In responding to the mandate of the 1990 Perkins Act, what is needed in the area of vocational education data is not a new independent, centralized vocational education data system. Much more desirable is a process for identifying major gaps in information and for deciding who is in the best position to fill them. Additionally, information on vocational education can be improved by concentrating on fine-tuning existing and planned data collection efforts to improve timing, eliminate inconsistencies, and to take advantage of low-cost opportunities to collect additional data. Finally, while data collection should remain decentralized, it would be desirable to centralize expertise in using these various datasets to analyze vocational education and provide quick, efficient responses to requests for information. Addressing such concerns is one of the primary aims of this study.

DESCRIBING CONTEXT AND TRENDS

Purposes of the Data

To assess the general evolution of vocational education nationally, policymakers and administrators need data that describes the big picture and trends and changes over time. Policymakers and administrators want to know basic information about the size of the vocational education enterprise: Is it growing or contracting, is growth greater at the secondary or postsecondary level, and are particular programs growing or contracting faster than others? Information about who participates in vocational education and to what degree is also important. Are the demographics of students changing with respect to age, race/ethnicity, gender, or special needs? Similar information about faculty teaching vocational education is also useful not only for monitoring the composition of secondary and postsecondary teachers but also for assessing potential shortages and surpluses of staff. Additionally, information on the outcomes of varying degrees of participation in vocational education is useful. What do students learn as a result of participating in vocational education, and how do they fare in the labor market over the long term? These are macro questions. Answers to them provide policymakers and administrators with information necessary for program planning and for setting priorities, targeting resources, and identifying areas needing new direction and leadership.

Data Collection Methods

Describing the general context for vocational education nationally and the relevant trends requires data that reflects a high degree of uniformity and comparability over the long term, as well as at any one point in time. The information, however, does not need to be collected very frequently because the variables usually do not change rapidly. Every four or five years is sufficient to detect trends and important changes.

Contextual data on vocational education should not be collected in isolation from other types of experience. At times, it may be useful to compare various types of vocational education experiences, various levels of participation in vocational education, or participation in vocational education with nonvocational education. Additionally, data used to detect national trends should support both longitudinal and cross-sectional analysis. In some instances, it may be useful to follow the same students, faculty,

schools, or institutions over time; while in others, it may be sufficient to compare similar groups at two or more points in time. Longitudinal data is particularly useful for tracking the various educational and career paths and outcomes of students, and cross-sectional data helps describe the scope of the vocational enterprise at a particular point in time.

Finally, sufficient data must be available to support relatively detailed analysis. If sampling methods are used, sample sizes need to be large enough to enable comparisons to be made among subgroups of the general population. However, not every study needs to address all questions. Therefore, the periodicity, context, type of trend analysis, and sample size of various data collection instruments may vary depending on the purpose of the study.

Ongoing, national sample surveys are especially well-suited to providing information for longer-term concerns. Compared to universal censuses or elaborate experimental designs, such surveys are relatively low-cost, low-burden strategies for producing accurate national estimates of key variables. To ensure consistency over time, responsibility for administering these surveys has been lodged with particular federal agencies experienced in national statistics—the National Center for Education Statistics (NCES), the Bureau of Labor Statistics (BLS), and the Bureau of the Census (Census), for example. These agencies ensure that the integrity of the surveys is maintained and that institutional knowledge about the data and methods builds over time. Changes in these surveys can be made to accommodate new concerns. However, such changes must be made with care so as to maintain the historical value of the surveys and to ensure that the changes have long-term future utility.

What makes these surveys so useful for describing the big picture renders them relatively ineffective for addressing shorter-run questions—for instance, about the effectiveness of particular government policies or initiatives. These surveys have long planning and implementation horizons that precede and cannot anticipate major shifts in national concerns about vocational education, nor are these surveys easily changed retroactively to reflect new initiatives. Understanding the consequences of particular policies and practices requires a very different approach (conducting special studies) that will be discussed in "Describing Program Practices."

Existing Data Collection Activities

NCES is the statistical agency with primary responsibility for collecting national data on education. Since 1984, NCES has relied on a strategy that gathers information on vocational education through a variety of existing survey instruments and in the context of general education. This integrated approach has had several advantages: (1) reducing the data burden on respondents by modifying existing data collection instead of creating new survey instruments; (2) increasing the reliability and comparability of the data collected by imposing uniform definitions and data collection procedures; and (3) increasing the power of the available data—for example, by facilitating comparisons between vocational and nonvocational education.

The following list summarizes the current and planned NCES databases that contain information on vocational education. Appendix A contains data maps for both secondary and postsecondary education that describe many of these databases in finer detail, including the specific pieces of information that are available on vocational education.

- Baccalaureate and Beyond (B&B)
- Beginning Postsecondary Students (BPS) (forthcoming)
- Common Core of Data (CCD)
- Fast Response Survey System (FRSS)
- High School & Beyond (HS&B) Sophomore and Senior Cohorts
- High School Transcript Study (HSTS) (also referred to as the NAEP transcript study)
- Integrated Postsecondary Education Data System (IPEDS)
- National Adult Literacy Survey (NALS)
- National Assessment of Educational Progress (NAEP)
- National Education Longitudinal Study of 1988 (NELS:88 or NELS)
- National Household Education Survey (NHES)
- National Longitudinal Study of 1972 (NLS–72)
- National Postsecondary Student Aid Study (NPSAS)

- National Survey of Postsecondary Faculty (NSOPF)
- Recent College Graduates Study (RCG)
- Schools and Staffing Survey (SASS)

In addition to relying on in-house databases, NCES also conducts or plans to conduct studies of vocational education using databases supported by other federal offices and agencies:

- Census of State and Federal Adult Correctional Facilities and Survey of Inmates of State Correctional Facilities, Bureau of Justice Statistics
- Current Population Survey (CPS), Bureau of the Census
- Education Profile Report and Post-Release Employment Project, Bureau of Prisons
- National Longitudinal Survey of Youth (NLS–Youth), Department of Labor
- National Longitudinal Transition Study (NLTS), Office of Special Education and Rehabilitative Services
- Study of Conditions of Confinement in Juvenile Detention and Correctional Facilities, Office of Juvenile Justice and Delinquency Prevention
- Survey of Income and Program Participation (SIPP), Bureau of the Census

The primary databases containing information on secondary vocational education include NAEP, NELS:88, SASS, and NLTS. The primary sources of postsecondary vocational education information include BPS, IPEDS, NHES, NPSAS, NSOPF, CPS, and SIPP. Several databases contain information relevant to both secondary and postsecondary vocational education, including HS&B and NLS–72. The longitudinal surveys, NELS:88 and NLTS, will contain postsecondary information in the future but currently only cover the secondary education experiences of participants.

These databases represent both longitudinal and cross-sectional data collection efforts. Cross-sectional surveys are conducted every two to four years at both the secondary and postsecondary levels: NAEP and NPSAS survey primarily students; SASS and NSOPF survey faculty; CCD and IPEDS collect data on the universe of secondary and postsecondary schools and institutions rather than rely on sampling techniques; and NHES and CPS collect information from the general U.S. population. Longitudinal surveys generally span both secondary and postsecondary education and

beyond and are launched approximately every eight years: NLS–72, HS&B, NELS:88, and NLTS follow students beginning in high school or earlier; BPS follows students who began their postsecondary education in 1990; and B&B (replacing RCG) follows students completing their baccalaureate degrees in 1993. SIPP represents a frequent but short-term longitudinal study, selecting a new sample from the adult U.S. population every one or two years and following the employment and income experiences of that group for about two and a half years.

Description of Available Information

The following sections describe how the data that is available through the above databases address the key policy and program management questions identified in the introductory chapter, and they describe any major gaps in information.

Organization and Governance

CCD tallies the total number of public secondary schools in each state and provides information on the types of schools, including regular, special education, alternative education, and vocational education schools. By matching this information with data on educational agency type, the database attempts to sort out area vocational centers from full-time vocational high schools. However, because of variations in state reporting methods, CCD currently undercounts area vocational centers in some states. Furthermore, the database does not indicate to what extent regular, special education, and alternative education schools offer vocational education. At the postsecondary level, IPEDS surveys the universe of postsecondary institutions in the country, including public and private institutions, and identifies those institutions offering an occupational program of study as part of their curriculum. However, IPEDS currently undercounts private, for-profit (proprietary) schools.

At the secondary level, the transcript studies are limited in their ability to provide information about student enrollment in area vocational centers. HS&B, NAEP, and NELS:88 do not include area vocational centers in their sample frames, although they ask whether vocational courses are taught off-campus. However, the accuracy of inferring area vocational center enrollments from information about the on- and off-campus location of courses has been questioned. Consequently, it is not possible to relate with

accuracy student participation, program offerings, or student outcomes to the various types of vocational education delivery systems. Although SASS surveys area vocational centers, these schools are not oversampled and are too few in number to produce reliable comparisons among teachers employed in various school settings.

Identifying various vocational education delivery systems is possible at the postsecondary level. NSOPF contains data on faculty in all nonproprietary postsecondary institutions granting associate degrees or higher, including public and private four-year institutions; community colleges; and private, nonprofit, less-than-four-year colleges. NPSAS contains information on students in *all* types of postsecondary institutions, including proprietary institutions and nondegree-granting vocational/technical institutes. Additionally, several longitudinal databases (HS&B, NLS–72, and BPS) contain or will contain transcript data from all types of postsecondary institutions offering vocational education, allowing comparisons across institutions at a fairly detailed level of analysis. However, as mentioned in the introduction, postsecondary institutions apply different methods for measuring class time, which presents a serious challenge to creating a common measure for comparison. Finally, NHES and CPS contain limited data on the participation of the general population in all types of postsecondary and adult vocational education.

Student Participation

Section 421 of the 1990 Perkins Act requires that the vocational education data system that is the subject of this study contain data reflecting the extent of participation of the following populations:

- Women
- Native Americans
- Individuals with handicaps
- Individuals of limited-English proficiency
- Economically disadvantaged students (including information on students in rural and urban areas)
- Adults in need of training and retraining
- Single parents

- Incarcerated youths or criminal offenders
- Individuals in programs designed to eliminate gender bias and sex stereotyping
- Minorities
- Displaced homemakers

Women, Native Americans, Individuals with Handicaps, and Minorities

All the major secondary education databases containing high school transcript data (HS&B Sophomores, NAEP, and NELS:88) and even those without such transcript data (NLS–72 and HS&B Seniors) can identify women, Native Americans, handicapped students, and other minorities. The major postsecondary education databases (NLS–72, HS&B, IPEDS, CPS, and NPSAS) can also identify women, Native Americans, and other racial-ethnic groups, while several (NLS–72, HS&B, and NPSAS) include variables identifying handicapped students. NLTS will provide additional information on disabled students at both the secondary and postsecondary levels.

Although these databases generally include Asians and Native Americans, the small sample sizes for these groups frequently render large apparent differences statistically insignificant. Furthermore, detailed analysis such as that by level of participation in vocational education, by institutional type, or by any other characteristic that requires dividing the sample of students into two or more groups almost always requires that researchers suppress statistics for these groups because the "cell size" (i.e., the number of students included in a specific category) does not meet minimum standards for confidentiality of the data. Similar problems occur when analyzing data for students by handicapping condition rather than overall handicap status and sometimes when analyzing data for Hispanic students. While sample size will inevitably become a problem as analysis is undertaken at finer and finer levels of detail, the small numbers of Asians and Native Americans, in particular, that are usually included in national studies makes even basic types of analysis difficult.

Individuals of Limited-English Proficiency

At the secondary level, only NELS:88 and NAEP 1990 identify limited-English proficient (LEP) students. The other secondary education datasets identify students whose home language is other than English but do not provide information about

proficiency. NAEP 1987 excluded severe LEP students from the main surveys, although it collected a small amount of data on such students, including achievement test scores, through a questionnaire completed by school officials. None of the postsecondary datasets currently identify LEP students. The 1993 NPSAS asks students to report the primary language that was spoken at home when they were children but does not provide information about English proficiency.

Economically Disadvantaged Students

At the secondary level, economically disadvantaged students are identified in several ways. Two of the datasets containing high school transcript data (HS&B and NELS:88) provide composite socioeconomic status (SES) variables created from parental background data such as mother's and father's occupations and education. NAEP 1987 and 1990 include SES-type variables in the surveys but not in the transcript studies. NAEP's SES variables are constructed from information on mother's and father's education and a list of reading materials available in the home. All of the major datasets contain urban/rural information, although some of the data is problematic.

At the postsecondary level, economically disadvantaged students can be identified using NLS–72, HS&B, and NPSAS. Although NLS–72 and HS&B provide composite SES variables created from parental background data, SES can be constructed in NPSAS from data on parents' educational levels, socioeconomic index scores of parents' occupations, and parents' income for dependent students. NLS–72 and HS&B describe the urbanicity of the student's high school. NPSAS provides information on the urbanicity of the postsecondary institutions but not of students' home communities.

Although not mentioned specifically in Section 421 of the 1990 Perkins Act, academically disadvantaged students can be identified at the secondary level using NAEP, NLS–72, and HS&B. These databases contain information on high school grades and NLS–72 and HS&B contain assessment scores. The 1990 NAEP study will also be able to link student transcript information to test scores. At the postsecondary level, NPSAS 1987 provides GPAs for students taking credit-hour courses, and NPSAS 1990 provides GPAs for all students.

The methods used to identify economically and academically disadvantaged students in the above-mentioned national studies are not necessarily consistent with the

definitions included in the Perkins regulations. These regulations define an economically disadvantaged family or individual as eligible by the following criteria:

- Aid to Families with Dependent Children
- Food Stamp Program
- Chapter I
- Free or reduced-price federal lunch (however, the National School Lunch Act prohibits the identification of individual students)
- JTPA

or by meeting any of the following criteria:

- In receipt of a Pell Grant or assistance under a comparable state program
- Determined to be low income according to the latest federal data
- Identified as low income according to other indices of economic status

Additionally, under the general definition of "disadvantaged" the regulations include migrants.

Although the use of SES variables may be consistent with the item "other indices of economic status," using additional measures of economic disadvantage could enrich existing analysis. For example, the longitudinal datasets that include adult cohorts (NLS–72, and HS&B Sophomore and Senior Cohorts) contain salary and public assistance history, and NPSAS provides information on state and federal financial aid and family income. However, collecting relevant information at the secondary education level is more problematic since student reporting of some of these variables may prove highly unreliable. Although an associated survey of school-level administrators could provide information on the program participation (Chapter I and JTPA) of individual students included in a study, such a survey could only indicate the overall proportion of students in the school or district receiving free or reduced-price federal lunches. Finally, none of the databases currently used for studies of vocational education identify students who are members of migrant families.

The Perkins regulations define an academically disadvantaged individual as someone without learning disabilities who

- scores at or below the 25th percentile on a standardized achievement or aptitude test,
- has a GPA below 2.0 on a 4.0 scale, and
- fails to attain minimum academic competencies.

Additionally, under the general definition of "disadvantaged," the regulations include

- LEP individuals and
- dropouts or potential dropouts from secondary school.

At the secondary education level, the several national databases containing assessment scores report these scores in terms of quartiles (i.e., four groups containing 25% of tested students each), coinciding with the legislative definition. However, achievement test scores are generally not available at the postsecondary level. As previously stated, secondary and postsecondary transcript studies can generate GPAs. Currently, academic competencies are not identified separately from assessment scores and GPAs, and the legislation is unclear about how these competencies should be measured. However, possible methods include examining remedial coursetaking or determining whether students meet the minimum standards identified in the *A Nation at Risk* report (National Commission on Excellence in Education [NCEE], 1983). Although NELS:88 identifies LEP students, postsecondary databases do not. Finally, while the longitudinal databases and postsecondary-level studies can identify high school dropouts, it is unclear how potential dropouts should be identified.

Adults in Need of Training and Retraining

The identification of adults in need of training or retraining is problematic even in the longitudinal databases since the term "adults in need of training or retraining" has not been defined. Although many indicators are possible, the choice of any particular one would be subjective. Possible indicators might include periods of unemployment or of employment in low-paying occupations other than the occupation of the student's vocational training. However, if a student is working in his or her vocational area for low wages, does this indicate a need for retraining? Does every adult who has low wages or is unemployed need retraining? These questions need to be resolved before this targeted population can be identified.

Furthermore, NLS–72 is the only longitudinal study with a cohort that progressed far enough into adulthood (fourteen years out of high school at the time of the last follow-up in 1986) to indicate whether they might need training or retraining. When the data for the HS&B Sophomore Cohort 1992 follow-up (at the point ten years after high school) is analyzed, their retraining needs may begin to be apparent. However, since graduates in their 20s often try out different occupations and may work in low-level jobs temporarily regardless of their education, determining retraining needs may still be premature.

Finally, one limitation of longitudinal studies is that they describe only the experiences of the cohorts included in them. Consequently, a cross-sectional, retrospective survey collecting data on the educational, vocational, and employment history of respondents would be a better source of information on the current number of adults in the population needing training or retraining. Such a survey could target either adults in vocational education or those in the general population. While existing cross-sectional surveys (NHES, CPS, and SIPP) estimate the number of adults participating in vocational education (and NHES collects data about their current educational experiences), they do not collect enough other educational or employment information to judge whether these adults in fact "need" training or retraining.

Single Parents

Single parents can be identified in every longitudinal dataset based on a cohort old enough to have children and report marital status, which includes every dataset except NELS:88. However, starting in 1990, even NELS:88 reports whether students have children. Additionally, two cross-sectional databases providing information on postsecondary vocational education (NPSAS and CPS) identify this special population.

Incarcerated Youths or Criminal Offenders

Several agencies gather information on incarcerated youths and adults. NALS samples inmates in state and federal prisons; the Bureau of Justice Statistics surveys state and federal adult correctional facilities and inmates in state correctional facilities; the Bureau of Prisons collects data on federal prisons and their former inmates; and the Office of Juvenile Justice and Delinquency Prevention collects data on juvenile detention and correctional facilities. Generally, the information on vocational education that is available from these sources is limited to whether incarcerated individuals participated in

any vocational training while in prison, although it may also include the duration of training. However, the Office of Juvenile Justice and Delinquency Prevention asks about participation in eleven vocational program areas, and the Bureau of Prisons tracks the recidivism and employment experiences of former inmates who completed vocational training during their prison stays. The surveys of adult and juvenile correctional education agencies and jail facilities, described in "Describing Program Practices" as part of the National Assessment of Vocational Education (NAVE) activities, will provide additional information on vocational education offered in these settings.

Individuals in Programs Designed To Eliminate Gender Bias and Sex Stereotyping

None of the datasets identify individuals participating in programs to eliminate gender bias and sex stereotyping in vocational education. At the secondary level, gender equity programs are not included in any dataset as one of the special vocational programs offered in the schools. Even if the programs were included, they cannot currently be linked to data on individual students. The only existing means of measuring gender equity or sex stereotyping at the secondary education level is through transcript data by calculating the percentage of female and male students enrolled in each type of vocational program or course. While this measures the need for gender equity in each occupational program area, it does not indicate whether there is a special program designed to address the issue or whether any students participate in such a program.

At the postsecondary level, IPEDS can be used to determine the percentage of female and male students earning degrees in each vocational program area every year. NPSAS can be used to calculate the percentage of female and male students who majored in each vocational program area during the survey years. NLS–72 and HS&B transcripts can be used to measure the percentage of female and male students taking each type of vocational course as well as the number of credits they earned in a vocational program area.

Displaced Homemakers

The term "displaced homemaker" cannot be applied to secondary students until many years after high school because the classification is based on life experiences. The final regulations associated with the 1990 Perkins Act defined a displaced homemaker as an individual who (1) is an adult; (2) has worked as an adult primarily without pay to care

for the home and family and for that reason has diminished marketable skills; and (3)(i) *has been dependent on public assistance or on the income of a relative but is no longer* supported by that income, (ii) is a parent whose youngest dependent child will become ineligible to receive Aid to Families with Dependent Children within two years of the parent's application for assistance under the Perkins Act, (iii) is unemployed or underemployed, or (iv) is described by (1) and (2) and is a criminal offender.

The above definition allows researchers some flexibility in identifying this population. While, to be useful, databases must provide information on age and employment history, they need only provide additional information on either public assistance history or current employment status. Surveys of adult criminal offenders need to provide information on employment history. While comprehensive information on displaced homemakers requires all of these types of data, the information can be pieced together from a number of different sources.

The primary challenge for providing information on displaced homemakers is defining what it means to have diminished marketable skills or to be underemployed. Do all adults who have been out of the labor market for a number of years possess diminished marketable skills? How should these skills be measured? Identifying underemployed adults presents the same definitional problem as identifying adults in need of training—if a student is working in his or her vocational area for low wages, does this indicate underemployment, or is every adult who has low wages underemployed? Careful attention needs to be paid to develop appropriate definitions of these concepts.

The longitudinal datasets including adult cohorts (NLS–72 and HS&B Sophomore and Senior Cohorts) contain employment history and public assistance history, which can be used to identify adults who have worked in the home without pay, those who are unemployed, and those who have been dependent on public assistance. However, these cohorts are still too young to have been at home long enough to possess diminished market skills and are barely old enough to have raised children. For the most part, displaced homemakers in the generation that originally defined the term—women in their late 30s, 40s, 50s, and 60s who stayed out of the labor market to care for children and were supported by either a husband or public assistance—are not in these longitudinal datasets.

At least two cross-sectional surveys (NPSAS and CPS) provide partial information on displaced homemakers by identifying women who have been divorced or widowed and those with and without children and by providing information on their current employment status. However, better information on participants' educational, employment, and public assistance history is necessary to identify this population. SIPP provides information on current employment status, including reasons why respondents are unemployed (e.g., they are taking care of home or family and are on current sources of income, including relatives, friends, or public assistance). With respect to underemployment, SIPP asks respondents who are working part-time whether they are doing so because they could not find a full-time job. Finally, SIPP includes several questions on work, education and training, public assistance, fertility, and marital history, providing a potentially rich source of information for identifying displaced homemakers. However, the amount of information available on current participation in vocational education is limited.

Program Offerings

Secondary vocational education program participation is well-documented from high school transcript data for four recent cohorts, including 1982 high school seniors (the Sophomore Cohort) in the longitudinal HS&B dates, 1987 and 1990 seniors in the cross-sectional NAEP transcript studies, and 1992 seniors in the longitudinal NELS:88 dataset. Program participation in these datasets is measured by the courses students took and the credits they earned in those courses. Participation in detailed vocational program areas can be monitored by classifying the courses at the six-digit CIP code level. In addition, the current National Longitudinal Transition Study (NLTS) on special education students is also collecting high school course records. The participation of later secondary school cohorts will be measured in future NAEP transcript studies (conducted approximately every three to four years) and in the next longitudinal study, approximately eight years after NELS:88.

Current enrollments in postsecondary vocational education are documented in IPEDS and in CPS. IPEDS reports total enrollments by institutional type as well as by occupationally specific program below the bachelor's level. CPS reports the number of adults taking vocational courses by type of provider but does not report enrollments by vocational program or major. Two longitudinal datasets containing postsecondary

transcript data (NLS–72 and HS&B) can provide data on enrollment patterns in detailed vocational programs. However, this information covers only the included cohorts.

NPSAS provides a periodic, cross-sectional survey of postsecondary students. Although it does not collect transcript data, NPSAS offers information on current enrollments in all types of postsecondary institutions and provides information on students' degree goals and majors at the six-digit CIP code level. However, it is unclear whether postsecondary institutions included in the survey define "enrollment" consistently and whether all students attending postsecondary institutions are represented, including students taking for-credit and not-for-credit courses and those with shorter- and longer-term goals (i.e., course completion versus certificate or degree completion). Furthermore, actual coursetaking patterns and students' ultimate degrees and majors upon graduation are not obtainable, except for that portion of the NPSAS sample who are included in the longitudinal BPS study. (Another subset of the NPSAS student sample will be included in the new longitudinal dataset, B&B; however, this dataset is not applicable to vocational education, other than vocational teachers, because it focuses on baccalaureate graduates only.)

IPEDS provides data on postsecondary vocational program completion by detailing the number of degrees and certificates awarded annually by postsecondary institutions. The database can be used to identify the number of postsecondary awards in vocational/technical areas at the two-, four-, and six-digit CIP code levels. However, gender and race/ethnicity are the only student characteristics reported.

Determining vocational program completion is much more problematic at the secondary education level. Schools do not usually award certificates or diplomas for completing a vocational program or indicate vocational program completion on student transcripts. Consequently, program completion must be inferred from coursetaking patterns as they are exhibited on transcripts. Considerable conceptual work needs to be done on what sequences or clusters of vocational and academic courses constitute programs. Furthermore, since postsecondary students participate in vocational education with widely varying goals, the award of a certificate or degree may not always be the most appropriate measure of completion for these students. Identifying additional measures of completion based on stated goals or on student or employer satisfaction with training may be worthwhile at the postsecondary level.

The sample size of the databases frequently limits the degree of programmatic detail that can be achieved in analyzing participation patterns. Transcript data usually produce reliable information on participation at the two-digit CIP code level, including about eleven vocational/technical programs. Although participation in as many as fifty programs can be examined, this level of detail requires suppressing a number of statistics because of low cell size, rendering comparisons among demographic subgroups incomplete. In contrast, IPEDS reports the number of instructional programs offered by an institution and the number of degrees and certificates awarded at the six-digit CIP code level, including several hundred programs.

In addition to standard occupational programs, vocational education also offers a number of related programs and services. Although specific activities change over time, policymakers and administrators have an ongoing interest in understanding the range and prevalence of different types of programs and services offered. Categories of ongoing interest include relationships between secondary and postsecondary education and institutions; relationships between school, business, and industry; services provided to special populations; and related extracurricular activities.

In recent years, school districts and postsecondary institutions have begun developing coordinated occupational programs spanning the last two years of high school and the first two years of higher education, referred to as Tech Prep programs. While an evaluation of Tech Prep will have to be undertaken through a special study of the sort described in "Describing Program Practices," it is possible to gather information on the prevalence of participation in the program through ongoing national data collection efforts. Data on the prevalence of Tech Prep may best be collected through periodic cross-sectional surveys at the secondary (NAEP) and postsecondary (NPSAS) levels. Furthermore, data can be collected at both the school and student levels: Is the school district or postsecondary institution a participant in a formal Tech Prep agreement? In what vocational program areas? Has the student included in the study formally enrolled in a Tech Prep program? What constitutes formal enrollment? Generally, these questions require surveying a school-level administrator familiar with the program, rather than relying on student-reported information. As part of the 1993-1994 SASS, NCES intends to ask secondary schools whether they have developed Tech Prep programs.

Transcripts may be used to examine the coursetaking patterns of students enrolled in Tech Prep programs. However, not all longitudinal studies collect transcripts at both the secondary and postsecondary education levels, making it difficult to compare coursetaking patterns at the two levels. In any case, the student cohort included in the most recent longitudinal study (NELS:88) will have exited high school before most Tech Prep programs have been implemented.

The 1990 Perkins Act also affirms an emphasis on serving members of special populations. An adjunct survey targeted at vocational education coordinators could attempt to describe the range and prevalence of services and activities that are provided to these populations, including those services and activities aimed at ensuring access to and success in quality vocational programs. Furthermore, services to disabled students could be examined by type of handicapping condition in order to assess at what level of severity students are being served (e.g., multihandicapped and mentally retarded students are generally considered to have more severe handicapping conditions than learning disabled and orthopedically impaired students). However, in order to provide reliable estimates by handicapping condition, surveys would need to oversample handicapped students, which could prove to be expensive. Such a survey could be associated with a cross-sectional study like the one described above or could replicate the 1984 HS&B administrator and teaching survey, which asked questions related to vocational programs and students. Although the 1984 survey suffered from low response rates and problems with the definition of vocational education programs, it could provide a point of departure for developing a similar survey in the future.

Administrator and faculty surveys could also investigate school-business relations, including the extent and form of business involvement in developing vocational curriculum, identifying and acquiring state-of-the-art equipment, and providing work experience opportunities. Additionally, included among vocationally related programs are vocational student organizations (VSOs), which include such groups as Future Farmers of America (FFA), Vocational Industrial Clubs of America (VICA), and the Technology Students Association (TSA). VSO activities attempt to develop work habits, teamwork skills, and self-confidence; provide leadership and competition experience; and are frequently integrated into the regular vocational curriculum. Collecting information on the number of students participating in VSOs nationwide does not require new data collection efforts since each national-level VSO already collects data annually on the

number of dues-paying members. Furthermore, VSOs can provide data on the sex of their members and some can provide students' race/ethnicity and education level (middle school, high school, or postsecondary). However, this data is not currently reported by NCES or any other federal agency.

In order to investigate the relationship between VSO involvement and other student characteristics and outcomes, this national membership data needs to be supplemented with data that is collected in the context of other educational activities. NCES has for some time included a question about VSO participation on its longitudinal surveys. However, the surveys do not ask to which specific organizations a student belongs. In addition, the surveys do not distinguish between membership and less formal participation in VSO activities. By revising the existing VSO-related questions, the longitudinal surveys could increase the analytic power of the data collected. However, the number of students participating in individual VSOs may be too small to produce reliable estimates.

Accomplishments

The longitudinal database for HS&B Sophomores (who were high school seniors in 1982) can link high school transcript data to subsequent labor market information, allowing researchers to relate detailed secondary vocational program participation to later educational and employment outcomes. HS&B also provides achievement test scores, which can be combined with program participation information to predict outcomes. In addition, while the student-reported GPAs have not proved reliable, GPAs derived from the high school transcripts can be used to assess the relationship between educational achievement and employment outcomes. Although this cohort was only four years out of high school at the time of the last follow-up in 1986, the 1992 follow-up will provide more substantial labor market outcome data.

In the future, NELS:88 will provide similar information for 1992 seniors. The NELS:88 dataset includes math, science, reading, and history achievement test scores from the eighth, tenth, and twelfth grades; and the high school transcripts will include GPAs. These measures of educational ability and achievement can be used to predict later education and employment outcomes.

Both NLS–72 and HS&B permit linking students' postsecondary school transcripts to later educational and employment outcomes. However, only the NLS–72 cohort is currently old enough to have substantial labor market outcomes to evaluate, although the HS&B Sophomore Cohort 1992 follow-up examines labor market outcomes ten years after high school and may be able to provide some information. Since the student sample in NPSAS is still in school, educational and labor market outcomes are not yet available. In the future, the BPS sample of NPSAS students will provide educational and occupational outcome information for the cohort that started postsecondary education in 1990, although it will be many years before their labor market participation is established. In order to link current employment information with past vocational training for a cross-section of the U.S. population, additional information on education history would have to be collected from participants in NHES and CPS. However, SIPP provides retrospective information on postsecondary vocational training and federal employment training for a cross-section of the population and links this information to current employment and income experiences.

Existing studies have tended to use measures of academic ability and achievement to explain participation in vocational education or subsequent success in the labor market or through further education. These studies generally have not examined test scores and GPAs as learning outcomes in themselves. However, NCES researchers will link transcript data with achievement test scores using the 1990 NAEP in an effort to determine academic outcomes and relate them to vocational coursetaking. This effort raises an important methodological issue: the difficulty in attributing performance on a standardized test to a single course, or even to a group of courses. By using gain scores, researchers can narrow the period during which change occurs and more effectively isolate the causes of that change. However, NAEP will use only a single test administration. At the least, careful work needs to be done to develop appropriate sequences or clusters of courses that can explain academic performance.

While achievement tests are routinely administered at the secondary level, similar measures of academic performance are not readily available at the postsecondary level. Currently, none of the existing national data collection efforts link postsecondary coursetaking with academic test scores.

Although some measures of academic outcomes are available, measures of occupational competencies and work readiness skills are not. Furthermore, measures of academic competencies as used in a vocational or applied setting and measures of learning about "all aspects of the industry" are also not readily available. Given the lack of widely recognized national tests of these skills, it is unlikely that much information concerning these learning outcomes will be included soon in national surveys. More conceptual work on what should be measured and on developing more appropriate assessment instruments needs to happen first.

Personnel

The 1984 HS&B administrator and teacher survey contains excellent questions about vocational teacher demographics, instructional methods, and efforts to find jobs for students and contains information on some teaching fields within vocational education; but the sample of teachers is too small to produce reliable results. Furthermore, the 1984 HS&B survey is an older, one-time data collection effort that suffered from low response rates and definitional problems. SASS provides rich information on the demographics, teaching experience, education, salary, benefits, and attitudes of secondary school teachers. However, the sample size is too small to permit analysis of vocational teachers below the two-digit CIP code level, and many types of analysis can only be applied to vocational teachers as a group. The classification of teaching assignment categories was greatly improved in the most recent SASS. However, additional improvements could be made, including separating out marketing and distribution from business education; subsuming accounting under business education; moving home economics (consumer and homemaking education) to under vocational education and creating a separate classification for occupational home economics; including the new term "technology education" alongside industrial arts; and defining the use of the term technical education to include computer, communications, engineering, and science technologies.

There is almost no information on secondary vocational administrators. Although two recent datasets (NAEP and SASS) included administrator surveys, NAEP did not identify vocational administrators separately from other administrators; and SASS, while identifying vocational administrators, asked them school-related questions rather than questions about their background or responsibilities. The 1984 HS&B administrator and teaching survey sampled vocational educational coordinators, but focused primarily on program- and student-related questions rather than on the administrators themselves.

The only data available on postsecondary faculty is through NSOPF. This survey provides information on the teaching fields of faculty members detailed to the four-digit CIP code. It also provides data on teacher demographics (gender, race/ethnicity, and age), educational background, part- and full-time teaching status, tenure, rank, salary, job and teaching history, workload, benefits, and attitudes. Although a rich dataset, NSOPF collects information on too few faculty having vocational education responsibilities to allow detailed analysis by vocational field. Furthermore, NSOPF collects data only from nonproprietary postsecondary institutions granting associate degrees or higher. Providing that sufficient funds were available, NCES should consider expanding the universe of NSOPF to include faculty in proprietary and less-than-two-year schools. NSOPF also contains virtually no information on postsecondary vocational administrators. Although NSOPF surveys department chairpersons, it provides faculty information only in aggregated form for each department.

Existing data collection efforts do not facilitate linking teacher experience and qualifications to student outcomes, analysis which requires collecting data on teachers and students from the same institutions. While the 1984 HS&B administrator and teaching survey contains some information about vocational faculty, teachers cannot be linked to individual students. Although NELS:88 will collect information from two teachers for each student included in a subsample of the study, vocational teachers will not be surveyed. Finally, no surveys have linked postsecondary vocational/technical faculty with their students, although BPS could possibly do so.

Linking vocational teacher experience and qualifications to student outcomes presents several challenges. Since linking information on teachers and students is an expensive undertaking, these issues require careful consideration. Policymakers, researchers, and educators must decide what outcomes can be attributed to individual vocational teachers. While it is reasonable to hold a teacher accountable for the learning that takes place within that teacher's classroom, some student outcomes such as job placement or program completion may have more to do with a student's cumulative school or program experience than with a single class or teacher. Furthermore, the learning that is assessed should be relevant to the vocational classroom environment. The validity of currently available standardized tests of academic skills as indicators of vocational teacher and student performance has been questioned.

Appropriate assessments of vocational student learning must be available before information on vocational teachers can be linked to the achievement of their students. In order to link student achievement with teacher experience and qualifications, NELS:88 collected data from teachers who taught the subjects assessed through the study. For example, math teachers were surveyed because math was one of the subjects tested through a standardized assessment. Student achievement in math could thus be linked to information about math teachers. However, linking the vocational achievement of students to information about vocational teachers is constrained by the availability of appropriate assessments of students' occupational or applied academic skills. Furthermore, even if they were available, occupational assessments that are tailored to a large number of program areas may be far too costly to administer. However, if assessments of applied academic skills become available in the future, these may be suitable for both vocational and academic classrooms.

A survey of faculty at either the secondary or postsecondary levels could include questions about vocational program involvement other than in the occupational teaching field. For example, faculty could be asked about their involvement in and responsibilities for Tech Prep and VSOs, although the number of faculty participating in these programs may be too small to produce reliable estimates. Surveys could ask about instructional methods, including different strategies for integrating vocational and academic education and teaching all aspects of the industry. More information on faculty preparation could also be gathered, including participation in staff development workshops on various topics emphasized in the Perkins legislation or time spent working in industry or in contact with industry.

Facilities and Equipment

There is no systematic overview of facilities in current NCES-type databases. Most surveys that collect secondary school-level data ask about services provided to students rather than about facilities. However, the HS&B 1984 survey of vocational coordinators does ask whether vocational training takes place at the school or elsewhere for seven programs areas, although as mentioned previously, the survey suffers from technical problems. At the postsecondary level, IPEDS asks only about library holdings, library costs, and physical plant costs.

There is also no systematic inventory of equipment of any type, let alone vocational education equipment. NAEP asks only about the number and use of computers in high schools. The HS&B survey of vocational education coordinators asks specifically about the presence of electronic and computerized equipment—electronic auto diagnostic equipment, micro- and mainframe computers, computer-aided design systems (CADs), and other computer-controlled machines—but does not ask about the quantity of these or about any other type of vocational training equipment.

Costs

CCD collects fiscal information from state education agencies, and IPEDS collects financial information from each institution. However, both surveys request information on expenditures by functional category (e.g., total salaries, benefits, and utilities), rather than by program. Consequently, expenditures for vocational education are not readily available.

Summary of Data Availability

Current data collection efforts on the part of NCES, the Census, and other federal agencies provide complementary and overlapping information on vocational education. However, while offering a rich and varied view, existing data is not able to answer all questions about the context and trends relevant to vocational education. NCES and other agencies have endeavored to improve the available information on vocational education and have done so in a number of ways. However, several broad problems remain: (1) a few gaps in information persist; (2) sample size sometimes hinders basic analysis; (3) coverage of vocational education delivery systems is incomplete; (4) certain special populations identified in the 1990 Perkins Act have not been defined adequately; (5) instruments measuring applied occupational and academic competencies and appropriate sequences of occupational and academic courses constituting programs have not been developed; (6) information on students, faculty, and institutions cannot always be linked; and (7) the timing of data collection does not always coincide with the cycle of reauthorization of federal funding for vocational education.

These problems are not the sole responsibility of the statistical agencies. Some gaps are best filled by other types of data collection, described later in this report. In

some cases, improved information requires better coordination among all producers and users of vocational education data.

Filling Gaps in Information

Ongoing national data collection of the sort conducted by NCES does not currently provide systematic or comprehensive information on vocational administrators. Although several databases identify vocational administrators, they tend to ask school- or program-related questions rather than questions about the background and responsibilities of the administrators themselves. Additionally, existing survey instruments do not provide information on vocational teacher training practices. Although staffing surveys ask about the qualifications and experience of faculty, none of the surveys canvass teacher-training institutions to determine what instructional methods are currently being taught.

NCES databases also do not include much information on the costs of vocational education, on facilities and equipment, or on governance structures and the organization of vocational education in each state. However, these types of information are more appropriately collected through other types of data collection, discussed later in this report.

Sample Size

Small sample size restricts analysis of vocational education in several ways. The small number of Asian and Native American students included in national surveys render large apparent differences statistically insignificant and hinder analysis by level of participation in vocational education and by institutional type. The overall sample size of the student databases also limits the amount of programmatic detail that can be examined. The small number of vocational faculty included in staffing surveys limits analysis to broad vocational teaching assignment categories and, in many cases, to vocational faculty as a group. While small sample size also generally prevents subnational comparisons (i.e., by state), this type of analysis is less appropriate for data describing general context and trends. The availability of state-level data are described in "Monitoring Program Compliance" and "Monitoring Program Performance."

Coverage

Although existing national data provides a rich source of information on the range of vocational education arrangements and activities, several gaps persist. Current databases undercount the number of area vocational centers and postsecondary proprietary schools; do not always include area vocational centers, or sufficient numbers of them, in their samples; and do not include information on faculty in postsecondary proprietary schools and vocational/technical institutes. Although surveys collect data on students in all types of postsecondary institutions, it is unclear whether students taking noncredit courses and those with short-term coursetaking goals are always included. Furthermore, little information is known about the various reasons adults enroll in postsecondary vocational courses and whether those adults achieve their personal goals.

Special Populations

Before existing databases can be used to provide information on adults in need of training and on displaced homemakers, educators and labor market experts need to define more precisely these special population groups. Specifically, concerned parties must address what it means to be underemployed and to have diminished market skills. Additionally, in order for national databases to produce reliable information on students with limited-English proficiency and those who are economically disadvantaged, researchers must find better ways to identify these students. Specifically, surveys need to provide information on language proficiency rather than dominance and on factors indicating economic disadvantage that do not rely on student self-reports, particularly at the secondary education level.

Occupational and Academic Competencies and Vocational Programs

It will be some time before national databases can provide information on the occupational and applied academic competencies of students participating in vocational education. While a number of efforts exist nationwide to develop performance-based assessments, these are not readily available. Vocational educators also need to clarify what is meant by experience in and understanding of all aspects of an industry. In order to determine the extent of participation in vocational education and to relate this participation to various student outcomes, considerable conceptual work needs to be done to develop sequences or clusters of courses that constitute vocational programs.

Student, Faculty, and Institutional Data Linkage

The structure of existing national surveys does not facilitate linking student, faculty, and school or institutional information. In particular, it has not been possible to link faculty qualifications, experience, and instructional methods to student outcomes or to link school- or institution-level information such as the level of economic disadvantage among the student population, local business involvement in vocational education, and the quality of facilities and equipment to student outcomes or to program offerings. Furthermore, administrators or faculty have not been consulted consistently about the participation of students in Tech Prep, VSOs, or Chapter I programs and about students' LEP or academic disadvantage status. Finally, while parents could provide information on economic disadvantage or migrant status, particularly for secondary level students, they have often not been surveyed. Although NELS:88 will collect information from teachers and parents for some of the secondary education students in the study, no similar capacity exists at the postsecondary level.

Timing

The timing of existing surveys does not always produce relevant data coincident with federal reauthorization of funding for vocational education. For example, no recent postsecondary transcript study has been conducted, and new postsecondary transcript data will not become available until the end of the 1993-1994 academic year. In some cases, this timing problem may be unavoidable. Because data on vocational education is collected in the context of other educational activities, the national surveys inform policy in several education-related areas and are subject to different reauthorization cycles.

In summary, ongoing national data collection efforts can be improved in several areas to provide more complete information on the context of and trends in vocational education. However, this data is not sufficient to meet all policy and program management needs. The following chapter, "Describing Program Practices," examines data that describes program practices, including evaluating specific policy initiatives.

DESCRIBING PROGRAM PRACTICES

Purposes of the Data

Ongoing, national surveys of the type discussed in "Describing Context and Trends" cannot answer many important questions about vocational program practices. Such surveys are limited in their ability to provide information on the organization and governance of vocational education in each state, on expenditures for vocational education, and on facilities and equipment. Accurate information on governance arrangements and organization is needed to direct requests for information to the appropriate sources and to facilitate communication between federal administrators or policymakers and local and state vocational educators. Such information also allows researchers to assess the strengths and weaknesses of the different arrangements for delivering vocational education. Information on local, state, and federal expenditures indicates the level of support offered to vocational education nationally—and offered to the activities, services, projects, and specific programs that comprise vocational education—in comparison with other educational activities. Information on the facilities and equipment used for vocational education provides an indication of student access to quality programs and of the relevance of training to industry practices.

Surveys designed to provide consistent information on context and trends over time also cannot assess the impact of many major policy initiatives in vocational education. Most recently, the 1990 Perkins Act established five major objectives for federal vocational education policy: (1) targeting federal funds to recipients with high concentrations of economically disadvantaged students, (2) ensuring access to and success in quality vocational programs for members of special populations, (3) encouraging the integration of vocational and academic education curriculum, (4) stimulating the development of Tech Prep programs that articulate secondary and postsecondary offerings, and (5) promoting accountability through the development of performance measures and standards for vocational education.

In assessing the impacts of these policy directions, two important sets of questions must be answered. First, what did local schools and institutions and states do in response to these initiatives? Were funds targeted? Were special populations served? Was curriculum integrated? Were Tech Prep programs developed? Were performance measures and standards implemented? Second, what impact did these policy responses

have on students participating in vocational education? As a result of these new policies, were students better prepared occupationally and academically to enter the labor market or pursue further education? Did they fare better in the labor market as a result?

The first set of questions requires specific, immediate responses. Congress will surely want clear answers to questions of implementation as it considers reauthorization of Perkins legislation in 1994 and 1995. The second set of questions cannot be answered immediately. Sufficient time must pass before the effects of policy changes on student outcomes can be detected. It will probably be five years or more before Congress can expect information on how its most recent policy initiatives affect students.

Data Collection Methods

Gathering information on specific vocational education practices requires conducting special studies. Such studies typically are not the responsibility of the statistical agencies, but of agencies charged with evaluation, implementation, and research. Thus, the 1990 Perkins Act re-established the National Assessment of Vocational Education (NAVE), located in the Office of Educational Research and Improvement (OERI), and charged it with evaluating a wide variety of topics. The act required a variety of other evaluations of specific policies to be conducted by the General Accounting Office (GAO); Planning and Evaluation Services (PES), located in the Office of Policy and Planning (OPP); and the Office of Vocational and Adult Education (OVAE). These agencies are responsible for evaluating the implementation of Perkins legislation, and their findings will figure prominently in the next reauthorization.

The 1990 Perkins Act also called for various research activities to be conducted through OERI and the National Center for Research in Vocational Education (NCRVE). While many of these activities such as developing new strategies that may influence future policy and practices are beyond the scope of this report, OERI and NCRVE also investigate program practices.

Describing program practices requires unique, one-time (or infrequent) studies specially tailored to understanding specific practices. Unlike ongoing national data collection, which must maintain consistency and comparability over time and relies on a

limited number of narrowly defined data elements, special studies endeavor to describe practices thoroughly at a single point in time and to capture variations in approaches. In some cases, special studies must coincide with the implementation of particular practices. Special studies may rely on and combine different data collection strategies, including mail and phone surveys, case studies, and quasi-experimental designs. Such studies may use national statistical databases as a source against which to compare the results of specially targeted data collection. Special studies may survey the universe of program providers or a sample of those providers, depending on the purpose of the study.

Since the organization and governance of vocational education within states change slowly, studies seeking to describe these arrangements need be conducted only infrequently, perhaps once every five or ten years. Studies investigating local and state funding practices and their relation to federal funding for vocational education, as well as facilities and equipment, should probably follow a similar time frame.

Assessing the implementation of federal policy initiatives requires studies tailored to understand local and state responses to federal legislation. What specifically did localities and states do in response to the 1990 Perkins Act? Understanding the impact of policy on student outcomes will take longer. It is essential that policymakers understand that they cannot expect to see in the near future detectable changes in student outcomes resulting from the 1990 Perkins initiatives. At least one to two years are needed to implement the kinds of curriculum and organizational changes that Congress sought in demanding integration, Tech Prep, and performance measures and standards. Completion of a Tech Prep program will take a minimum of four years. Another one to two years following completion is needed to assess labor market outcomes. Allowing time for data analysis and reporting, one would not expect to see the results of, for example, a rigorous evaluation of Tech Prep until seven or eight years after the initial passage of the 1990 Perkins Act. Although the national statistical surveys will be able to contribute to assessing these longer-term impacts, special studies and research will need to supplement them.

Existing Data Collection Activities

The primary vehicle for collecting data on the impact of the 1990 Perkins Act on program practices is NAVE. Replacing an earlier study of vocational education authorized by the 1976 Vocational Education Act Amendments, NAVE was first established by the 1984 Perkins Act and was reauthorized in 1990. Currently, NAVE is required to study the distribution of federal education funds to the states as well as describe and evaluate the following ten features of vocational education:

1. The effect on tribal and state administration of vocational education programs and on local vocational education practices.

2. Expenditures at the local, tribal, state, and federal levels to address program improvement in vocational education, including the impact of federal allocation requirements (such as within-state allocation formulas) on the delivery of services.

3. Preparation and qualifications of teachers of vocational and academic curricula in vocational education programs.

4. Participation in vocational education programs—in particular, access of individuals who are members of special populations to high-quality vocational education programs and the manner in which this participation affects the delivery of services to such populations.

5. Academic and employment outcomes, including analyses of (1) the effect of educational reform on vocational education, (2) the extent and success of integration of vocational and academic curricula, (3) the success of the school-to-work transition, and (4) the degree to which vocational training is relevant to subsequent employment.

6. Employer involvement in and satisfaction with vocational education programs.

7. The effect of performance standards and other measures of accountability on the delivery of vocational education services.

8. The effect of federal requirements regarding criteria for services to special populations, participatory planning in the states, and articulation between secondary and postsecondary programs.

9. Coordination of services.

10. The degree to which minority students are involved in vocational student organizations.

In order to fulfill its mandate, NAVE is employing a number of data collection strategies, including the following:

- State and local omnibus surveys
- Community, tribal, and funding case studies
- Perkins funding distribution analysis
- Secondary and postsecondary program participation analysis
- Surveys of adult and juvenile correctional education agencies and jail facilities
- Employer surveys
- Study linking unemployment insurance and student data

The omnibus surveys were sent to administrators for vocational education at both the secondary and postsecondary levels in each state, and to administrators in a sample of secondary schools and districts and postsecondary institutions across the nation. Distributed in the spring of 1992, the surveys attempted to describe the current status of vocational education as well as any changes that occurred between the last year of the 1984 Perkins Act and the first year of the new one. In order to provide more descriptive detail about the processes affecting vocational education, NAVE researchers also conducted twenty community case studies, eight funding case studies, and five tribal case studies. Additional analysis of how states distributed their Perkins funds under the new guidelines will be conducted using data submitted by the fifty states.

Program participation is being analyzed using statistical databases from the National Center for Education Statistics (NCES). Three new surveys of adult and juvenile correctional education agencies and jail facilities in the fifty states were developed by OVAE and distributed in the spring of 1993. Employment outcomes are being analyzed through surveys of a sample of employers nationwide and a study linking unemployment insurance and student data in selected states.

In addition to NAVE, several other federal agencies have recently conducted or are in the process of conducting special studies of vocational program practices. The following list summarizes the most relevant studies:

Office of Vocational and Adult Education (OVAE)

- Performance measures and standards study

Planning and Evaluation Services (PES)

- Tech Prep evaluation

National Center for Research in Vocational Education (NCRVE)

- Study of education and training for work
- Study of strategies linking planning and evaluation
- Surveys of performance measures and standards implementation
- Study of performance measures and standards effects

Although requiring that specific topics be studied, the 1990 Perkins Act allowed the designated agencies to design their studies as they deemed appropriate. Most of the studies have not yet been completed. The OVAE study of performance measures and standards will involve a mail survey of secondary and postsecondary vocational education administrators in the fifty states; and site visits to nine states, including interviews with local and state vocational educators; and other activities. The PES evaluation of Tech Prep will involve surveys of state-level coordinators and local Tech Prep programs, plus an in-depth examination of selected local programs and a longitudinal survey of a sample of Tech Prep students. The NCRVE study of education and training for work, conducted during 1990, involved interviewing a number of state-level administrators in each of the fifty states. The two NCRVE surveys of performance measures and standards implementation gathered information from all the states in the fall of 1991 and then again in the fall of 1992 and involved intensive phone follow-up with secondary and postsecondary vocational education administrators in each state. Finally, the NCRVE study of performance measures and standards effects will focus on four states, including visits at both the local and state levels in each.

Description of Available Information

The following sections describe how the information that is available through the above data collection activities addresses the key policy and program management questions identified in the "Introduction," and they describe any limitations of the data.

Organization and Governance

Until very recently, the only comprehensive study of the organization and governance of vocational education was a study sponsored by the old Office of Planning, Budgeting, and Evaluation (OPBE) and conducted during 1977 (Woodruff, 1978). While providing information on each of the states and territories, the OPBE study also developed schemes for classifying the different types of governance and organization elements. The study included information for each state on the type of state board for vocational education, the composition of governing boards, agency responsibilities and authority, interagency coordination, and the history of changes in state education agencies affecting vocational education. The study also described for each state the numbers and types of institutions offering vocational education at both the secondary and postsecondary levels and the types of local delivery systems, regional service arrangements, local governing authority, as well as the composition of local authority and the type of fiscal agent.

In late 1992, NCRVE published a study conducted by RAND of education and training for work in the fifty states (McDonnell & Zellman, 1993). Unlike the earlier OPBE study, the NCRVE study did not attempt to create new classification schemes for state practices. Instead, the study described how each state governs and finances education and training programs, providing an overview of five state and federal education and training programs: secondary vocational education, postsecondary vocational education, Job Training Partnership Act (JTPA), welfare-to-work, and state-funded job training. Descriptions of secondary and postsecondary vocational education included the types and numbers of institutions delivering vocational education in each state and the ways that states govern vocational education. The sections on governance identified for each state and at each level of education the governing board for vocational education, the governing board's responsibilities, the state agency with administrative responsibility, the extent of state influence over local secondary institutions, and the extent of state involvement in postsecondary vocational education. The study also included a description of the elements of each state's program approval process.

While providing new information on the governance of job training programs, the NCRVE study did not provide the degree of comprehensive information that the earlier OPBE study on the governance of vocational education. Specifically, the NCRVE study did not describe fully the relationship between the state board for vocational education

and the agencies responsible for administering vocational education at both the secondary and postsecondary levels or between the state board for vocational education and the boards governing the responsible agencies. Neither did the study describe fully the types of institutions over which each administrative agency has authority. Consequently, the NCRVE study provides only a partial picture of vocational education in some states.

NCRVE also recently published a study of strategies linking planning and evaluation in vocational-technical education that identified the most common structures of state vocational education administration (Elson, Oliver, & Strickland, 1992). The study provided organizational charts describing the five dominant relationships among responsible boards and agencies. However, the report did not indicate which states possessed which administrative structures, nor did the organizational charts incorporate the various types of schools and institutions offering vocational programs.

Together, the two NCRVE reports provide substantial information on the current governance and organization of vocational education in the fifty states. Relatively little additional work needs to be done to provide a comprehensive picture of each state's system that includes a description of the relationships among all the relevant boards, agencies, and institutional types.

Student Participation

A primary emphasis of NAVE is to assess the access of special populations to quality vocational education. Information on this topic is being gathered through several methods. At the state level, the omnibus surveys asked about the steps states have taken to provide equal access. At the local level, the surveys asked about the types of supplemental services provided to the various special populations, about special population involvement in developing the local vocational education plan, and about total school enrollment and enrollment in vocational education of the different populations. In addition, the surveys asked about changes occurring over time with regard to these different factors. While describing overall participation in vocational education, the omnibus surveys did not provide information on enrollment of special populations in specific occupational programs.

The case studies conducted by NAVE during the winter of 1992-1993 allowed researchers to identify exemplary vocational programs at a secondary or postsecondary

site, interview faculty and students in those programs, and observe classes in progress. The specific occupational programs that schools and institutions considered to be exemplary varied from site to site. Although researchers could easily identify the male and female students in a classroom, identifying other special populations was not possible just through observation. Researchers had to rely on faculty, counselor, and administrator knowledge of the students enrolled in order to assess whether the various special populations were participating. In some cases, student record data was available to confirm the professionals' impressions while in others they were not.

The case studies were also limited in their ability to verify that a designated exemplary program was in fact a high quality vocational program. Frequently, programs were deemed exemplary because they held a high status among local vocational programs. In some cases, these programs had acquired a significant amount of state-of-the-art equipment or other technology. In other cases, exemplary programs held a high status because of the type of student they attracted, generally a college-bound student. Usually, local schools and institutions did not base exemplary status on expected or actual long-term labor market outcomes nor on the amount or type of learning in a particular program. (As performance measures and standards systems are established at the local level, schools and institutions should be able to provide better information on the relative performance of their various programs.) Although limited in ability to determine the quality of vocational programs, the case studies described the processes by which vocational programs achieved high status and by which students, particularly special population students, were encouraged or discouraged to enroll in those high-status programs.

The enrollment of special populations in specific occupational programs nationally is more reliably determined using statistical databases. The NAVE study will examine the participation of special populations at the secondary level, using the 1982 High School and Beyond (HS&B) study, the 1987 and 1990 National Assessment of Educational Progress (NAEP) study, and the 1988 National Educational Longitudinal Study (NELS:88). The NAVE researchers will use survey and transcript data to analyze participation at a relatively detailed program level for the different groups and will examine changes in participation over time. Additionally, NAVE intends to use the 1990 Schools and Staffing Survey (SASS) to examine the relationship between teacher characteristics and student demographics, in particular to examine the proportion of

special populations enrolled in various vocational classrooms. At the postsecondary level, NAVE will use the 1987 and 1990 National Postsecondary Student Aid Studies (NPSAS) and the Beginning Postsecondary Students (BPS) databases.

Although it is too early in the process of implementing the 1990 Perkins Act to assess the impact of recent initiatives on special populations, NAVE can assess to what extent schools and institutions have targeted federal funds to serve these students. The eight NAVE funding case studies investigated how local spending of federal vocational education funds for secondary education changed under the new act, selecting four school districts that gained Perkins funds under the new requirements and four that lost funds. Specifically, these case studies examined how school districts concentrated their Perkins funds during 1991-1992 and 1992-1993 on sites or programs with high concentrations of special populations, what types of activities they funded, and how the uses of funds differed from spending under the 1984 Perkins Act. Site visitors asked about trends in local and state funding for vocational education and attempted to ascertain whether local and state funds substituted for the loss of Perkins funds or gains in Perkins funds substituted for those other funds. The funding case studies also asked about general services provided for special populations and about how Perkins funding fit into the overall scheme for serving these groups.

Although the funding case studies focused only on secondary education, NAVE is also conducting a national analysis of the distribution of Perkins funds for both secondary and postsecondary education. Based on data submitted by the states, NAVE will compare how states distributed their Title II basic grant funds to school districts and postsecondary institutions under the old and new acts. Specifically, researchers will assess to what extent the new funding requirements were successful in concentrating federal vocational education funds on areas with high numbers of special populations and, in particular, on inner-city areas.

NAVE also conducted five tribal case studies focusing on Native Americans. These case studies examined the effects of the federal legislation on tribal administration, tribal expenditures for program improvement, the participation of Native American youth in vocational education programs and their access to high-quality programs, and the relevancy of tribal vocational education programs to local employment opportunities. NAVE researchers will assess the similarities and differences in implementation and

effects of the federal legislation in tribal and nontribal settings. In addition to the five field investigations, administrative information will be collected on the thirty-eight Perkins-funded tribal grantees under Section 103 of the act.

NAVE will also analyze data from OVAE's specially targeted surveys of vocational education in adult and juvenile correctional facilities. However, since the surveys were not distributed until the spring of 1993, the information that will be available by time of reauthorization may be limited.

Program Offerings

As discussed in "Describing Context and Trends," the national statistical surveys provide reliable information on the trends in nationwide enrollments in vocational education. NAVE, on the other hand, is particularly suited to ask about the factors influencing those enrollments. The local omnibus surveys, sent to administrators in secondary schools and districts and in postsecondary institutions, asked about overall enrollments, vocational education enrollments, changes in enrollments over time, and reasons why vocational enrollments either increased or decreased. At the postsecondary level, the surveys asked about enrollments in specific program areas. The local surveys also asked about vocational program offerings, the changes in program offerings over time, and the possible reasons for those changes.

During the case studies, NAVE researchers delved more thoroughly into the possible reasons for changes in enrollments and program offerings as well as factors affecting program completion by asking several administrators and faculty at each site for their opinions about these trends. Site visitors asked administrators, vocational and nonvocational faculty, local business people, students and (at the secondary level) parents about their perceptions of the quality and usefulness of vocational education in their area and asked students why they chose or did not choose to participate in vocational education. While it is beyond the scope of NAVE to verify independently which factors influenced enrollments, the case studies provided the opportunity to determine whether similar perceptions were shared among a number of important providers and users of vocational education in a local area.

Ongoing national surveys of the type discussed in "Describing Context and Trends" are not well-suited to provide information on new instructional methods and

other innovative program practices. However, by focusing on the implementation of current, federally supported vocational education initiatives, NAVE is able to investigate these concerns. The state-level omnibus surveys asked secondary and postsecondary vocational education administrators in the spring of 1992 about integration of vocational and academic education, teaching of all aspects of a given industry, implementation of performance measures and standards, Tech Prep, and school-to-work transition programs, and efforts to coordinate with JTPA and other federal programs.

At the local level, the omnibus surveys asked about the vocational curriculum, including the use of applied materials and courses, and about integration, performance measures and standards, Tech Prep, school-to-work transition, the extent of participation of business and labor, vocational student organizations, and local coordination with other federal programs. Specifically, the surveys asked what steps were taken to implement these practices, whether there had been an increase or decrease of effort under the new act, and how much the amount of assistance provided had changed. The case studies provided additional opportunities to assess implementation of these practices at the local level and included a study of vocational course materials for secondary vocational education.

NAVE will conduct a separate survey of VSOs, with particular attention to the participation of minorities in them. Although NAVE is able to investigate the extent of implementation of the various programs and practices early in the period of the new act, it is limited in its ability to determine the effects of changes on the quality of vocational education and on students. At most, NAVE was able to ask administrators and faculty about their perceptions of the effects of implementing a particular program or practice. In many cases, local professionals were only able to speculate on the effects or to provide anecdotal evidence since changes had been in place at most for one or two years at the time the surveys were distributed and the case studies were conducted in 1992 and 1993.

In addition to NAVE, the 1990 Perkins Act authorized several other agencies to conduct studies of the implementation and effects of specific initiatives. Four separate studies are being done of performance measures and standards, and one longer-term evaluation is being done of Tech Prep.

Section 115 of the 1990 Perkins Act and the associated regulations require that each state board receiving funds under the act develop and implement a statewide system of core standards and measures of performance for secondary, postsecondary, and adult vocational education programs. This core set of measures and standards is to be used by recipients of Title II funds to evaluate annually the effectiveness of their vocational education programs. NCRVE has completed two studies, and is in the process of conducting a third, on this topic. The first study asked state-level administrators of both secondary and postsecondary vocational education about their plans for implementing the federal requirements approximately one year before the implementation deadline. This study helped NCRVE identify areas where states needed technical assistance. The second study followed up with the states to determine what performance measures and standards they actually implemented in the fall of 1992 and documented the various state approaches.

Although the first two studies focused on implementation, NCRVE is also preparing to conduct a study of the preliminary effects of performance measures and standards systems on program practices and students. This third study will involve selecting four states that have made substantial progress in implementing their systems and conducting both local and state site visits in those states during 1993 and then again in 1994. By the fall of the second year of the study, vocational educators should have collected and reviewed two years worth of data and should be in the second cycle of program evaluations. Although it may still be too early to detect changes in student performance, the study should be able to ascertain whether the systems of performance measures and standards have led educators to develop and implement strategies for program improvement.

OVAE will be conducting its own study of performance measures and standards, focusing on evaluating the soundness and the technical rigor of the measures and standards systems implemented by the states. The study will include the following three components:

1. A detailed description of the status of each state's system of standards and measures developed under the act.

2. An assessment of the validity, predictiveness, and reliability of such standards and measures, unbiased to special populations, in the areas of academic achievement, vocational skill competencies, employment outcomes, and postsecondary continuation and attainment.

3. An evaluation of the comparability of state-developed performance standards across states to establish a core of common indicators.

The OVAE study will involve a mail survey to vocational education administrators at both the secondary and postsecondary levels in each state as well as nine site visits to states during 1994, including studies of three secondary and three postsecondary programs in each of the states visited. Although the implementation of performance measures and standards and their preliminary program effects should be well-documented by the time of reauthorization of the Perkins legislation, information about the effects on student performance will be limited. Future statistical surveys such as NAEP, NPSAS, and the longitudinal surveys should provide some indication of these effects.

Title III Part E of the 1990 Perkins Act authorizes planning and demonstration grants to be awarded to consortia of school districts and postsecondary institutions for developing and operating four-year Tech Prep programs leading to a two-year associate degree or certificate. The Tech Prep initiative is intended to provide strong, comprehensive links between secondary schools and postsecondary institutions in a more systematic manner than previously. PES in OPP is conducting a five-year evaluation of the effectiveness of these programs. Beginning in 1993 and ending in 1997, the evaluation will describe the Tech Prep programs funded under the act, identify effective practices, and measure the progress of some Tech Prep students. The evaluation will involve surveys of state-level coordinators and local Tech Prep programs, in-depth examinations of selected local programs, a longitudinal survey of a sample of Tech Prep students drawn in the eleventh grade, and collection of school records data. The outcomes for Tech Prep students will be compared with those for a corresponding national sample of students. Only preliminary information will be available by the time of reauthorization of Perkins legislation in 1994 and 1995.

Accomplishments

NAVE will gather information on outcomes for students in vocational education from a variety of sources. Using NELS:88, NAVE researchers will link transcript data

with achievement test scores in an effort to determine academic outcomes and relate them to vocational coursetaking for secondary-level students. Unlike a similar analysis being conducted by the NCES using the 1990 NAEP, NELS:88 supplies gain scores (eighth to tenth grades and tenth to twelfth grades), allowing researchers to narrow the period during which change occurs and to isolate more effectively the causes of that change. In an effort to analyze outcomes for special education students, researchers will apply similar methods using the National Longitudinal Transition Study (NLTS). However, as discussed in "Describing Context and Trends," these efforts raise an important methodological issue: the difficulty of attributing performance on a standardized test to a single course or to a group of courses. Over the long term, careful work needs to be done to develop appropriate sequences or clusters of courses that can explain academic performance.

NAVE will also examine employment outcomes of students in vocational education through several avenues. The Center on Educational Quality of the Workforce will conduct a study linking unemployment insurance and school data. The study will track the employment outcomes for former participants in vocational education at both the secondary and postsecondary levels in five states. In addition, NAVE will conduct a telephone survey of about 3,000 employers nationwide, asking about their involvement with local vocational education programs and about their satisfaction with newly hired employees. NAVE will also analyze employment outcomes for former students in vocational programs through the Survey of Income and Program Participation (SIPP). SIPP provides retrospective information on postsecondary vocational training and federal employment training for a cross-section of the U.S. population and links this information to current employment and income experiences.

Personnel

The NAVE omnibus surveys asked state-level administrators about the numbers and responsibilities of the professional staff who spend most of their time on vocational education and about the changes in those numbers and responsibilities from the last year under the 1984 Perkins Act to the first year under the new one. The local surveys asked about the numbers of administrators, teachers, and other professional and paraprofessional staff responsible for vocational education and about the changes in those numbers over time. The local surveys also asked whether coordinator positions existed for sex equity, Tech Prep, integration, and special populations. During the case studies,

NAVE researchers investigated the possible reasons for increases or decreases in the number of staff with vocational education responsibilities as well as the changing responsibilities of those staff.

In addition to relying on the omnibus surveys and case studies, NAVE will also use several statistical databases to examine faculty characteristics such as demographics, qualifications, and experience. NAVE researchers will use the National Survey of Postsecondary Faculty (NSOPF) to study the characteristics of postsecondary vocational faculty and the Fast Response Survey System (FRSS) and SASS to study secondary vocational faculty. In addition, NAVE is using SASS to analyze faculty shortages. However, SASS provides information only on administrators' recent experiences with hiring vocational faculty. NAVE will not assess supply and demand independently, either through data on teacher training program enrollments and completions, industry-based employee interest in and qualifications for teaching, or state-level and institutional vocational program planning and hiring projections. Because of a delay in implementing the latest NSOPF, NAVE researchers will not be able to conduct a similar analysis of faculty shortages at the postsecondary level, and their descriptions of postsecondary vocational faculty characteristics will be based on data collected in 1987.

Facilities and Equipment

The only comprehensive study of vocational education facilities was part of the OPBE study conducted in 1977. This study included a discussion of the adequacy of facilities nationwide, examining the locations of institutions and instructional stations offering vocational education in comparison with population distribution and examining the size of institutions in terms of vocational enrollments and the number of shops, laboratories, and classrooms available to students. The OPBE study also included a discussion of the condition of facilities and their adequacy for serving physically handicapped students. However, information on these latter topics was based on institutional self-reports. The study did not verify independently the reliability of this information. The study also included a discussion of the utilization of vocational facilities, including the use of school-based facilities (i.e., during the regular school day, during alternate operating schedules, and during operating hours) and of community resources. The OPBE study did not include information on equipment used for vocational education.

Costs

The old OPBE study included information on the factors affecting state policies for the financing of vocational education, on program funding models (including the types of allocation units and computation procedures used in each state), and on financing of facilities and equipment (including methods for distributing funds such as capital funding sources and funding mechanisms). The study also included a discussion of the limitations of the data for determining the direct impact of federal funds on the expansion of facilities and for determining the total amount of federal funds expended on facilities and equipment.

The 1992 NCRVE study of education and training for work gathered up-to-date information on funding sources and mechanisms, including for each state the state-aid formula for general education funding; any student vocational education weight factors used in the state-aid formula; restrictions on the use of state funds; total vocational education funding; the percentage of funds coming from local, state, and federal sources (including tuition at the postsecondary level); and the percentage of Perkins funds allocated to secondary and postsecondary vocational education. However, information on total vocational education funding in the state and on the percentage of funds coming from local, state, and federal sources was based strictly on interviews with state-level administrators. The study did not describe how these administrators arrived at their estimates for funding nor was it within the scope of the study to verify the estimates by interviewing local vocational education administrators.

The NAVE omnibus surveys asked state-level directors of vocational education about changes in funding for vocational education from the last year under the old act (1990-1991) to the first year under the new one (1991-1992), including the total operating budget for the agency or division and additional state and federal funds, and requested information on Perkins funds received, including Title II basic grants and Title III funds. The state-level surveys also asked administrators to estimate the total public expenditure for (secondary or postsecondary) vocational education in their state and to estimate what percentage of those funds came from various sources. The possible sources included general school district budgets, state vocational education funds, other state funds, Perkins funds, other federal funds, and other funds. However, almost twenty percent of secondary agencies (10 out of 56) and over forty percent of postsecondary agencies (20

out of 48) responding to the survey indicated they were not able to estimate the total public expenditure for vocational education in their states.

In addition to asking about the amounts of funds for vocational education, the omnibus surveys also requested information on procedures and decision-making processes. Information was sought on how Perkins funds were split between secondary and postsecondary vocational education, why local applications for Perkins funding were disapproved (if any were disapproved), what accounted for any major differences in the numbers of institutions receiving Perkins funds under the old and new acts, whether the state developed a procedure for granting waivers on minimum grant amounts, and how the allocation of Perkins funds among school districts and postsecondary institutions within the state was carried out.

At the local level, the omnibus surveys asked questions about changes in school district budgets and postsecondary institution revenues and about the sources of those funds. The surveys also asked about funds received under the different titles and sections of the 1990 Perkins Act and how Title II funds were being used. The surveys requested that administrators indicate whether various changes in the 1990 Perkins Act had a positive or negative effect on the implementation of vocational programs.

The eight funding case studies provided NAVE researchers with the opportunity to delve more deeply into the impact of federal allocation requirements on the delivery of services at the local level for secondary vocational education. The sites included four school districts that experienced large increases in funding under the 1990 Perkins Act and four that experienced large decreases. The data gathered for these funding case studies were drawn from district budgets and enrollment records as well as from interviews with teachers, counselors, and administrators. Site visitors discussed with school and district personnel the trends in funding for vocational education over the past several years and into the future and the reasons for any increases or decreases. They also discussed the uses of local, state, and federal funds over the years and the ways those uses may have changed under the 1990 Perkins Act.

The funding case studies attempted to assess what negative impacts there may have been on districts losing Perkins funds, particularly on the special populations in those districts. Researchers investigated to what extent local and state funds substituted

for federal funds, possibly lessening the blow. Researchers also attempted to determine how the districts gaining Perkins funds spent their funds, whether they had a well-devised plan for implementing new services, and whether funds were targeted to special populations.

The funding case studies attempted to estimate expenditures for vocational education at the district level. Although some districts maintained separate budgets for vocational education, most did not. Where those districts did not keep comprehensive expenditure information for vocational education, NAVE researchers estimated costs based on information collected from a variety of sources, including average teacher salaries for grades nine through twelve; the estimated full-time equivalent (FTE) for vocational faculty; administrator salaries and FTEs; and expenditures for facilities, equipment, and supplies.

Finally, NAVE is conducting a study of the allocation of Perkins funds through the Education Finance Center. This study is examining the federal allocation of funds to the states as well as the within-state funding distribution. The aim is to determine whether Perkins funds were concentrated in areas with high numbers of economically disadvantaged students as intended by the 1990 Perkins Act.

Summary of Data Availability

The special studies conducted on the part of NAVE, OVAE, PES, NCRVE, and other federal agencies contribute breadth and depth to the information collected on vocational education at the national level. While filling in some of the obvious gaps left by the statistical surveys as discussed in "Describing Context and Trends," these studies also add texture to what is known about the vocational/technical enterprise. NAVE, in particular, represents an ambitious undertaking and promises to describe many aspects of current vocational education practices that are of concern to policymakers and program managers. Despite their comprehensiveness, the existing special studies are limited in their ability to describe program practices in a few areas. Some of these problems are shared among all agencies attempting to collect data on vocational education:

- Providing comprehensive information on the interrelationships among the various boards and agencies responsible for vocational education and the institutions offering vocational education.

- Defining and identifying high-quality vocational programs.
- Measuring learning outcomes.
- Providing comprehensive information on the supply and demand of vocational faculty.
- Assessing the condition of vocational facilities and equipment.
- Estimating the costs of vocational education.
- Providing timely information for reauthorization.

Organization and Governance

Although the NCRVE studies of education and training for work and strategies for linking planning and evaluation provide a strong starting point for understanding current state organization and governance structures for vocational education, the studies do not fully describe the interrelationships between the different responsible boards, agencies, and institutions in each state. Comprehensive information on the lines of authority and responsibilities for vocational education is necessary for understanding how state and federal policies for vocational education are implemented. Without comprehensive information on organization and governance, researchers, policymakers, and administrators are hindered in gathering complete information on vocational education and interpreting that information accurately.

High-Quality Vocational Programs

NAVE will collect a significant amount of information on the participation of special populations in vocational education and on vocational program offerings through a variety of data collection methods. However, NAVE's ability, as well as the ability of the statistical surveys discussed in "Describing Context and Trends," to assess participation in and availability of high-quality vocational programs is limited by the lack of definition of such programs. In what ways do high-quality programs differ from high-status programs? Should high-quality programs be defined at a local, state, or national level? Should they be defined in terms of their level of technology (i.e., "high tech" versus "low tech" programs), their expected long-term labor market outcomes, the level of occupationally or academic specific learning they produce, or the types of learning they engender (e.g., integrating vocational and academic education, teaching all aspects of a given industry, or providing a Tech Prep education)? Until some sort of consensus is

achieved about what constitutes high-quality vocational programs, special studies (as well as the statistical surveys) will be limited in their ability to assess to what extent programs are providing high-quality vocational education across the nation and whether special populations have equal access to that education.

Learning Outcomes

Current special studies are limited in their ability to provide information on the learning outcomes of students participating in vocational education. As mentioned previously, NAVE will attempt to link achievement test scores to coursetaking patterns for secondary-level students using statistical surveys included in the discussion in "Describing Context and Trends." However, achievement tests are generally not available at the postsecondary level, and the statistical surveys do not provide information on occupational competencies, to a large extent because appropriate assessment instruments are not widely available.

Faculty Supply and Demand

NAVE will provide partial information on the supply and demand of vocational faculty. By analyzing SASS data, NAVE researchers will be able to describe administrators' experiences with hiring vocational faculty at the secondary level. However, NSOPF data will not be available for similar analysis at the postsecondary level. Furthermore, this type of analysis provides only part of the picture. Other sources of information include teacher training program enrollments and completions, industry-based employee interest in and qualifications for teaching, and institutional and state-level vocational program planning and hiring projections.

Facilities and Equipment

The only comprehensive study of vocational education facilities was conducted by OPBE in 1977, and this study based its analysis of the condition of facilities on institutional self-assessments using broad categories such as "in good condition," "in need of minor maintenance," "in need of major maintenance," and "in need of replacement." Furthermore, the study did not include an assessment of the equipment used for vocational education. The information available for special studies from the statistical surveys is also limited.

Cost of Vocational Education

Although providing useful information on local uses of Perkins funds and state-level funding mechanisms, existing special studies are not able to provide accurate information on the cost of vocational education nationally, largely because the information is not readily available. While states are able to provide information on the level of Perkins funds and any targeted state funds they distribute to local school districts and postsecondary institutions, they are less able to provide reliable information on local expenditures for vocational education. Furthermore, local school districts and postsecondary institutions generally do not maintain a separate budget for vocational education. Although these districts and institutions track Perkins funds and targeted state funds, they can only estimate total expenditures for vocational education. A reliable estimate of what is spent nationally must be based on a consistent estimating methodology. Although the eight NAVE funding case studies provide a starting point for determining the cost of vocational education, the case study sample size is too small to produce an accurate national estimate and would only do so for secondary vocational education.

Timing

The existing special studies will be unable to provide information on some questions in time for reauthorization of Perkins legislation in 1994 and 1995. Because of problems with data availability, NAVE may not complete its analysis of vocational education in adult and juvenile correctional facilities by that time, and the Center on Educational Quality of the Workforce may not complete its study of employment outcomes. The newest NSOPF data on postsecondary faculty will not be available in time to even begin analysis before reauthorization. Furthermore, although the NAVE studies of participation in vocational education are based on the most recent available statistical datasets (1982 HS&B, 1987 and 1990 NAEP, the 1990 year of NELS:88, 1990 SASS, 1987 and 1990 NPSAS, and the 1990 year of BPS), none of these provides information on the time period of the 1990 Perkins Act, which took effect during the 1991-1992 academic year. Finally, PES will not conclude its study of the effectiveness of Tech Prep until 1997.

To a large extent, the problem of timing is unavoidable. Because of the 2+2 nature of Tech Prep, and because of the time needed for implementing the program and assessing labor market outcomes, data on program effectiveness will not be available

within the five-year authorization cycle. Because of the periodic nature of the national statistical surveys, and the time required to plan and conduct the surveys and analyze the data, the most recent datasets able to produce results in time for reauthorization were conducted just prior to implementation of the 1990 Perkins Act. However, NAVE and the other special studies will provide rich information on the implementation of the latest Perkins legislation while leaving an assessment of the impact on outcomes to future surveys and studies.

In summary, special studies provide the opportunity to answer many important questions about vocational program practices that are left unanswered by the national statistical surveys. The data collection activities described in the next two sections provide additional sources of information, particularly on vocational education at the local and state levels.

MONITORING PROGRAM COMPLIANCE

Purposes of the Data

The agencies overseeing the implementation and administration of federal policy for vocational education are responsible for monitoring whether local and state recipients of federal funds are in compliance with various federal requirements. Such agencies monitor the distribution and uses of Perkins funds, review and approve state plans for vocational education, ensure that federally protected populations are served equitably, and track and assist with problems encountered in implementing federal law and regulations. At the federal level, the Office of Vocational and Adult Education (OVAE) has the primary responsibility for compliance-monitoring functions; and at the local and state level, these responsibilities are parceled out through a variety of administrative arrangements.

Data Collection Methods

What most distinguishes the compliance-monitoring function from describing context and trends and program practices is that the information supporting this function must be maintained (although not necessarily reported) by all those who are accountable.

While the actual collection of data to assess compliance may rely on sampling techniques, data must be maintained by the universe of recipients of federal funds. Thus, for example, all school districts, postsecondary, and state institutions receiving Perkins funds must maintain data on the distribution and uses of those funds, although in any given year, only a few may undergo an audit of this information.

While data describing context and trends and program practices are intended to produce an overall picture of vocational education nationally, data collected for compliance purposes are generally intended to describe the actions of individual recipients. Ongoing, national surveys generally do not produce reliable statistics on states or individual schools and institutions. In contrast, compliance data is designed to enable the monitoring agencies to identify particular schools, institutions, and states that are not meeting their federal obligations.

Because monitoring compliance generally requires collecting and maintaining data by the universe of recipients, its requirements can be extraordinarily costly and burdensome. Extreme care must be taken in defining the parameters of data needed for this function as well as the extent to which states and locals will be required to report information rather than simply maintain it.

Existing Data Collection Activities

OVAE is the primary federal agency responsible for monitoring compliance of recipients of Perkins funds with the provisions of the legislation. OVAE staff engage in a number of monitoring activities involving local school districts, institutions, and states. The agency maintains information on the distribution of Perkins funds to the states and expects states to account for the distribution of Perkins funds to local recipients. OVAE also approves each state plan for vocational education and keeps records of them. However, the information contained in the state plans is maintained separately for each state and does not constitute a database.

In addition to federal monitoring of state compliance, the 1990 Perkins Act expects state boards for vocational education to monitor local recipients to assure their compliance with the provisions of the act. The act specifically requires these boards to

provide assurances in their state plans that they will conduct adequate monitoring of how well local recipients are meeting the needs of special populations. While engaging in a number of monitoring activities, state boards are also responsible for approving local applications for Perkins funds and for maintaining those applications at the state level.

The Office of Civil Rights (OCR) enforces the *Guidelines for Eliminating Discrimination and Denial of Services on the Basis of Race, Color, National Origin, Sex and Handicap in Vocational Education Programs* (34 CFR, Part 80, Appendix B). Issued in 1979, the guidelines require state vocational education agencies to develop their own civil rights compliance programs. Each agency must collect and analyze data annually on participation in vocational education for each facility receiving federal funds, conduct compliance reviews during a five-year cycle, provide technical assistance upon request, and submit periodic reports to OCR. OCR also produces a biennial Elementary and Secondary School Civil Rights Compliance Report for which it surveys a sample of schools nationwide. For the first time, the 1992 survey will include several hundred vocational education schools identified in the Common Core of Data (CCD).

Pursuant to the Deficit Reduction Act of 1984, federal legislation established the Federal Income Verification System (FIVS), requiring each state to provide wage record data to verify the eligibility of applicants for Aid to Families with Dependent Children, Medicaid, Food Stamps, Child Support Enforcement, and other federal programs. Most states responded to the legislation by setting up a wage report system, housed in their state's employment security agencies, which collect wage record information four times a year from most employers in the state. Although FIVS was set up for purposes unrelated to vocational education, wage record data is being used in many states to determine the employment outcomes of former participants in vocational/technical programs.

The following list summarizes the compliance-related data collection efforts:

Office of Vocational and Adult Education (OVAE)

- Record of distribution of Perkins funds to states
- State plans

State Vocational Education Boards

- Record of distribution of Perkins funds to local recipients
- Local applications

Office of Civil Rights (OCR)

- Vocational education civil rights compliance programs
- Elementary and Secondary School Civil Rights Compliance Report

State Employment Security Agencies (SESAs)

- Wage record information

Description of Available Information

Although compliance data is collected for highly specific, usually legislated purposes, they are a potentially valuable source of general information for policymakers and vocational educators. As stated in the introductory chapter, the four functions of data on vocational education discussed in "Describing Context and Trends," "Describing Program Practices," "Monitoring Program Compliance," and "Monitoring Program Performance" are not mutually exclusive. Data that serves one function can be useful in another, and data collected for all four functions can be used to establish federal policy and to manage programs. The following sections describe the information on the seven primary questions concerning vocational education that is available from data collected for compliance monitoring purposes.

Organization and Governance

OVAE maintains some information on the governance of vocational education in each state through the state plans. The state plan must identify the designated board for vocational education in the state as well as describe how the board delegates its functions. Although the designated state board is the sole agency responsible for administering the state's vocational education program, the 1990 Perkins Act allows the board to transfer many of its responsibilities to more appropriate state agencies responsible for actually implementing vocational education at the secondary and postsecondary levels. However, the amount of detail provided in the state plans on the roles and responsibilities of each

agency and board involved in administering vocational education varies from state to state.

Student Participation

The state plans for vocational education and local applications for funds describe how recipients will ensure equal access for special populations to the full range of vocational education programs and activities, including high quality vocational programs. Local applications also contain the number of individuals enrolled who are members of special populations and describe how the needs of these individuals will be assessed and met. Although these plans and applications provide information on local and state intentions to serve special populations and the varying methods for doing so, they do not provide information on actual implementation or effects. Revised and resubmitted on an annual basis, the state plans are required to describe the progress that has been made in achieving the goals described in previous state plans.

As part of their civil rights compliance programs, state vocational education agencies collect data annually on vocational students by race/ethnicity, limited-English proficiency, sex, and handicap. However, because the compliance programs were designed independently by each state, the specific data that are collected by the states vary. For example, some states collect data on total enrollment in vocational education by facility, while others collect enrollment data for each occupational program in the facility. Some states compare the incidence of special populations in the general service area with the incidence of these populations in vocational/technical programs, while others do not make any extra-facility comparisons. Consequently, the data collected to fulfill civil rights compliance requirements are not comparable across states. Furthermore, since data collection is the responsibility of each state, not OCR, this data does not constitute a database. Finally, civil rights compliance does not require that states collect data on other special populations receiving emphasis in the 1990 Perkins Act—specifically, economically or academically disadvantaged students, other than those with limited-English proficiency, or incarcerated individuals, or other targeted populations such as adults in need of training and retraining, single parents, and displaced homemakers.

The Elementary and Secondary School Civil Rights Compliance Report published biennially by OCR includes enrollment data on sex, race/ethnicity, limited-English

proficiency, disabled status, and specific disability for a sample of schools nationwide. In addition, the survey requests various combinations of these demographic characteristics—for instance, the number of LEP students enrolled by sex, race/ethnicity, and disabled status. Beginning with the 1992 survey, OCR will publish enrollment data for a sample of vocational education schools. However, since the sample is based on the CCD, the survey will be subject to the same limitations regarding the CCD as described in "Describing Context and Trends." The survey will also not provide program-level information.

Program Offerings

Each state board receiving 1990 Perkins Act funds was required to conduct an assessment of vocational program quality using criteria that encompassed a broad range of program characteristics, including the extent of integration of vocational and academic education, sequential courses of study, linkages between secondary and postsecondary educational institutions, instruction and experience in all aspects of a given industry, relevance of programs to the workplace and to specific occupations, and basic and higher-order competencies. Consequently, each state plan describes the results of these assessments and the ways the states propose to use their Perkins funds to address the needs revealed through the assessments.

The local applications describe how local recipients propose using Perkins funds to integrate vocational and academic education, develop coherent sequences of courses, provide a Tech Prep education, provide supplementary services for special populations, develop apprenticeship programs, tie programs to economic development efforts, and train students in all aspects of a given industry, among other uses. However, as stated previously, these plans and applications provide information on local and state intentions rather than on actual implementation or effects.

The Elementary and Secondary School Civil Rights Compliance Report published biennially by OCR will provide information on the status of special education and LEP programs in vocational schools; on enrollment in advanced placement courses in math, science, and computer science; and on high school completion. However, as mentioned previously, the report will not provide information on enrollment in specific occupational programs.

Accomplishments

The vast majority of states collect wage reports from employers on a quarterly basis through their SESAs. Wage reports generally include the social security number and total wages earned for each employee during the quarter. SESAs usually maintain five quarters of wage record information in their active files. State agencies responsible for administering vocational education, employment training, and other educational programs have begun to tap this database as a source of information on the employment and earnings outcomes of former program participants.

In their basic form, wage record data provides a rough look at the employment status and level of earnings of former participants in vocational/technical education. However, the data must be supplemented in order to provide more comprehensive outcomes information. First, while collecting industry information from each employer, most wage reports do not indicate the occupation in which an employee works. Vocational educators who are interested in the relatedness of employment to training either supplement the wage record data with an employer survey requesting occupational information or estimate the likelihood that an employee working in a particular industry is employed in an occupation related to training, based on industry/occupation matrices developed by the federal Bureau of Labor Statistics and its state counterparts. Second, while covering the majority of employers in a state, wage record systems exclude certain types of employers and employment. Vocational educators who wish to increase the likelihood of locating former program participants supplement SESA wage record data with data on military enlistment, state and federal civilian employment, enrollment in higher education, and employment in adjacent states, among other sources of information. Other technical issues must also be addressed when using wage record data. The National Occupational Information Coordinating Committee (NOICC) will be publishing a guide to using wage record data for follow-up purposes by the end of the summer of 1993.

Personnel

The state plans describe how each state vocational education agency will provide programs for personnel and curriculum development. The local applications describe how Perkins funds will be used to provide inservice training of both vocational and academic instructors for integrating vocational and academic education. At the postsecondary level, local applications describe mentor programs for individuals

employed in business and industry who are interested in becoming classroom instructors or for vocational educators wishing to upgrade their teaching competencies.

As part of their civil rights compliance programs, most state vocational education agencies collect data annually on vocational faculty by sex and race/ethnicity. The Elementary and Secondary School Civil Rights Compliance Report will provide information on the demographics of teachers in vocational schools and will provide comparisons with nonvocational schools.

Facilities and Equipment

Compliance data provides very little information on facilities and equipment. However, local applications describe how recipients will use Perkins funds to purchase equipment, including instructional aids, and to adapt equipment.

Costs of Vocational Education

Although not collected in a central database, information on the distribution and expenditures of Perkins funds is maintained by the various recipients of those funds. OVAE maintains information on the federal distribution of funds to the states; state boards for vocational education maintain information on the distribution of Perkins funds to local recipients; and local school districts and postsecondary institutions maintain an accounting of the expenditures of the funds they receive. Furthermore, OVAE has information on the proposed uses of state funds contained in the state plans, and the state boards for vocational education have information on the proposed uses of local funds contained in the local applications.

Summary of Data Availability

The data collected for compliance purposes is generally dictated by federal legislation and, as such, is sufficient for meeting their intended purposes. However, this data is also a potential source of valuable information for researchers, policymakers, and vocational educators. In this context, the primary problem is inaccessibility. Although federal law or policy may sometimes restrict access to the data, its inaccessibility stems more from a lack of understanding on the part of the responsible agencies in regards to the usefulness of this data for forming vocational education policy and for managing

vocational programs and from a lack of knowledge on the part of potential data users of its availability.

However, a real limitation of using the data for other than its intended purposes is that it is not always collected in a single, central location or does not constitute a database. While collected centrally by the states and OVAE, the local applications and state plans are maintained separately on paper for each recipient of Perkins funds. A complete picture of the distribution of Perkins funds to local recipients requires gathering information from each of the states, and a complete picture of the expenditures of Perkins funds requires gathering information directly from local recipients. (As discussed in "Describing Program Practices," the NAVE is conducting a study of state allocations of Title II funds to local recipients and gathering information from a sample of local recipients on the general uses of Perkins funds, although not the amounts allocated for each use, through the omnibus surveys.) The data collected for state vocational education civil rights compliance programs is sometimes part of state vocational education databases, but the extent of data automation varies by state; and in some cases, data for civil rights compliance purposes is kept separateiy from the mainstream of vocational education data. Wage record information constitutes a database in the majority of states. Perhaps the most centrally kept compliance data is part of the biennial Elementary and Secondary School Civil Rights Compliance Report issued by OCR, although this data describes a sample of vocational schools rather the universe and covers only secondary vocational education.

In summary, compliance data provides a potentially valuable source of information on vocational education, particularly for those policymakers and program managers interested in the status of vocational education at the local and state levels.

MONITORING PROGRAM PERFORMANCE

Purposes of the Data

What does vocational education accomplish? Educators and policymakers at all levels ask this question. They are interested in a variety of program outcomes including what kinds of occupational and academic skills students acquire through vocational programs, how many students pursue further education and training, how program participants fare in the labor market, and how well programs respond to short- and longer-term demands for different types of labor and mixes of skills. To answer these questions, local and state educational agencies and institutions have developed and continue to refine a variety of data systems designed to yield information on how well vocational education is performing. These systems include occupational information systems providing data on labor market demand and supply, management information systems providing program data on students and faculty, and recently enacted accountability systems establishing outcome-based performance measures and standards for secondary and postsecondary vocational programs.

It is essential to understand that the primary purpose of these performance monitoring systems is *local and state program improvement*: helping local and state educators respond more effectively to the needs of students and the marketplace. To this end, the systems must reflect the diversity that characterizes vocational education by adapting to local and state needs and circumstances.

This emphasis on local and state program improvement means that the systems vary substantially from locality to locality and state to state. Precisely what is collected, when, and how often varies because systems are designed to meet local and state objectives, as well as to conform to local and state systems of governance and operation of the entire educational enterprise. Consequently, these systems are usually not well-suited to providing uniform national data on program performance. Because definitions and methods of collection vary, local and state systems cannot yield information that can be aggregated across states to produce national estimates on the performance of vocational education. Any effort to impose greater comparability and uniformity on these systems risks undermining the primary purpose of these systems, which is to provide locals and states with a powerful tool for monitoring and assessing the effectiveness of their particular vocational education programs.

Nevertheless, national estimates of program performance are certainly desirable; and over the long run, Congress will want evidence that the policies it promotes are producing the desired effects on students' occupational and academic attainment and on their success in the labor market. Such data, however, will best come from other sources—for example, from the national longitudinal surveys and special studies.

Consequently, the role of the federal government in developing data that will serve to improve local and state programs lies not in developing national data systems per se but rather in monitoring the efforts of locals and states to develop systems and in providing appropriate technical assistance. Historically, Congress has adopted this approach in encouraging states to develop and implement state occupational information systems. This strategy should also guide the development of the federally required accountability systems as well as other efforts to strengthen program management information. Where uniformity and comparability do not seriously conflict with local and state objectives, they should be encouraged. However, the requirements of local and state program improvement should dictate system design, not the desire for statistically rigorous national estimates.

Data Collection Methods

As long as curriculum content and program operations remain a local and state responsibility, the design of data systems aimed at monitoring and improving program performance should remain a local and state activity. Federal policy may, of course, offer guidance and establish general topics that should be included in such systems. The federal government can also provide generic definitions, examples of operational strategies, and assistance with the technical aspects of system design and program evaluation. In the final analysis, however, the design and maintenance of these systems is up to local and state agencies and institutions.

Probably the single most important methodological feature that the federal government could promote is the adoption of data systems based on individual student and faculty records, that is, systems in which information about students and faculty is collected and stored for each individual. Such an approach permits almost any kind of data aggregation and maintains the most flexibility for analysis.

Nevertheless, some states will resist systems built around individual records. Despite the dramatic decreases in the costs of data storage and data processing, systems based on individual records can still be costly and complex. Some states reject such systems on philosophical grounds, believing that individual records invite invasion of privacy and other undesirable consequences. Consequently, it will be some time before all states develop and maintain individual record systems for monitoring secondary and postsecondary vocational education performance. Some states will continue to collect and report information at a higher level of aggregation such as the classroom, program, institution, or local education agency.

Left to their own devices—albeit with federal guidelines and technical assistance—locals and states will adopt a wide variety of methods for collecting and using data to monitor program performance. These diverse strategies should not cause concern for federal policy as long as other strategies are developed for obtaining national estimates of program outcomes.

Existing Data Collection Activities

Efforts to collect data for monitoring program performance consist of three major activities: (1) occupational information systems, (2) management information systems, and (3) accountability systems of performance measures and standards. Each of these is briefly reviewed below.

Occupational Information Systems

Occupational Information Systems (OIS) are computerized databases containing occupational and labor market information designed to help states meet the occupational information needs of various vocational education and training programs.[3] Established by Congress in 1976, State Occupational Information Coordinating Committees (SOICCs) have developed their own OIS programs with financial and technical support from the National Occupational Information Coordinating Committee (NOICC). Gathering information from a variety of sources, OIS programs generally include current

[3] The term OIS will be used to refer to both an Occupational Information System (singular) and Occupational Information Systems (plural).

and projected demand for workers by occupation and information on the supply of graduates from related training programs. Some systems contain information on the working conditions, educational requirements, wages, and benefits of specific occupations as well as information about training programs, educational institutions, industries, and employers in the state. OIS programs can provide information on occupational supply and demand statewide as well as for substate regions.

Management Information Systems

Most state agencies with responsibility for vocational education possess a Management Information System (MIS) containing data on students and faculty in vocational education.[4] These systems vary widely in their organization, level of automation, and content. While most states maintain separate systems for secondary and postsecondary vocational education and for vocational and general education at each level, some states have developed integrated MIS databases. Most states have some capacity for data automation at the state level, although very few have direct, on-line linkages with local secondary educational agencies and postsecondary institutions. Capacity for data automation varies even more widely at the local level, particularly at the secondary education level, with a number of local educational agencies nationwide still maintaining data in the form of paper records. Although an increasing number of states are developing automated student record systems, about half of the vocational agencies at both the secondary and postsecondary levels do not possess this capacity. States vary in the level of aggregation at which they collect data from local providers as well as in the specific information elements they request. Appendix B describes the findings from the site visits conducted for this study regarding varying local and state MIS practices.

State-level vocational education administrators use MIS data in a variety of ways: (1) to prepare annual performance reports submitted to the Office of Vocational and Adult Education (OVAE); (2) to conduct program evaluations, generally on a five-year review cycle; (3) to distribute state vocational education funds in those states with targeted funds; (4) to respond to compliance requirements from the Office of Civil Rights (OCR); and (5) to respond to ad hoc requests for information from various sources, including executive and legislative offices in the state.

[4] The term MIS will be used to refer to both a Management Information System (singular) and Management Information Systems (plural).

At the local level, many school districts (especially larger ones) and postsecondary institutions have their own MIS. These systems may be maintained separately for vocational and general education or may constitute an integrated database. Local providers of vocational education use MIS data primarily to conduct their own periodic program reviews and to respond to state- and national-level requests for information.

OVAE is in the process of developing a national-level MIS that will include data collected from each of the states. Currently, OVAE is the federal recipient of the states' annual performance reports for vocational education; however, these reports do not constitute a database. The new MIS will maintain an automated record of a limited number of data elements submitted by each state, and will be used by OVAE primarily to assist states in managing and improving their vocational programs. The data submitted to OVAE by the states will generally be drawn from state-level MIS databases.

Performance Measures and Standards Systems[5]

The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 requires states to develop accountability systems that include performance measures and standards for secondary and postsecondary vocational education programs. These systems are to include at least two sets of performance measures. One set must measure learning and competency gains, including student progress in the achievement of basic and more advanced academic skills. The other set must measure any one of the following: (1) competency attainment; (2) job or work skill attainment; (3) retention in school; or (4) placement in further education, the military or employment. These systems must also include appropriate adjustments and incentives for encouraging services to students with special needs. Local recipients and states may supplement these minimal requirements with additional measures, and local recipients may modify measures and standards to reflect local demographic or economic conditions.

Most states want to go well beyond the minimum requirements of the 1990 Perkins Act. They recognize that limiting their systems to just two measures and standards would unwisely displace a number of other important goals of vocational

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[5] This section draws heavily on E. Gareth Hoachlander, Karen Levesque, and Mikala Rahn's (1992), *Accountability for Vocational Education: A Practitioner's Guide*. Interested readers are advised to consult this guide for a more detailed treatment of the topics covered in this section.

education. The four optional goals are equally important, although states need choose only one to comply with the minimum requirements of the 1990 Perkins Act. Yet, in excluding three options from consideration, states might imply that these outcomes no longer mattered or that their importance had considerably diminished. Consequently, many states are planning to incorporate all five measures outlined by the 1990 Perkins Act—and in some cases even more measures—in their accountability systems.

As of this writing, all of the states have developed and begun implementing systems of measures and standards for secondary and postsecondary vocational education programs. These systems generally overlap with their MIS. Implementation began in fall 1992, and all states at least nominally responded to the minimum requirements of the 1990 Perkins Act for two sets of measures and standards, with most states exceeding these minimums (Rahn, Hoachlander, & Levesque, forthcoming). Whether, in fact, the states' measures and standards are appropriate will be the subject of a Congressionally mandated study of the states' responses to the accountability requirements of the 1990 Perkins Act. The study, conducted through OVAE, will examine the validity and reliability of measures and standards adopted by the states and also assess the degree of comparability and uniformity that exists among state systems. The department will report its findings to Congress by September 1994.

In developing their systems of measures and standards, states have adopted widely varying approaches. Some states have taken a centralized approach to designing their measures, prescribing the specific assessment instruments or data collection procedures to be used by local recipients, while others have taken a decentralized approach, allowing local recipients to choose the specific instruments or procedures. Still other states have adopted a mixed approach, prescribing the requirements on some measures and allowing flexibility on others. The extent of centralization generally depends on the availability of assessment instruments and the pre-existence of statewide procedures for monitoring vocational program performance. Some states will collect local performance data through a central state office, while others will leave data collection and analysis primarily to local recipients. The comparability of information generated by the systems of performance measures and standards will be complicated by the diversity of approaches taken by the states.

Description of Available Information

The following sections describe the types of information that are available through the above-mentioned data systems. While the primary purpose of data describing program performance is local and state program improvement, this data may be useful for informing other policy and program management questions.

Organization and Governance

Most states operate a State Training Inventory (STI) as part of their OIS. The STI contains information on the schools offering vocational education and training programs in that state and can generate a list of the specific programs offered by each institution and in each geographical area in the state. A national database maintained by NOICC consolidates the information compiled in each state. Although containing information on thousands of schools and institutions offering vocational education nationwide and tens of thousands of vocational programs, STI databases depend on the voluntary participation of secondary and postsecondary education agencies and consequently do not constitute the universe of vocational education providers.

State-level MIS for vocational education are generally able to provide the number of local education agencies and postsecondary institutions offering vocational education in a state. However, depending upon the organization of vocational education in a state and the scope of a state's MIS, these systems may contain information only on Perkins-funded programs and institutions. Vocational education that is supported wholly through local and state funds may not be included in these systems. Piecing together a comprehensive picture of vocational education in a state may require gathering information from several different databases and agencies. Information on nonfederally funded vocational education may not be readily available. The annual performance reports submitted to OVAE usually include a description of the types of secondary schools and postsecondary institutions offering vocational education in a state, but, once again, may only include federally funded providers.

Student Participation

State-level MIS exhibit varying capacities for identifying special populations. Most systems can tally the number of students enrolled in vocational courses or completing vocational programs by sex and race/ethnicity; but generally, only those

systems with automated student records are able to produce these statistics for other targeted groups. State agencies that collect data aggregated at the school or institution level may be able to report the number of special population students participating in vocational education overall but not the numbers participating in specific occupational programs.

One problem is that some data collection procedures developed under the 1984 Perkins Act did not request program-level information for all special population groups. The 1984 Perkins Act required funding set-asides for six groups: (1) handicapped students, (2) disadvantaged students, (3) adults in need of training and retraining, (4) single parents and homemakers, (5) students in programs designed to eliminate sex bias and stereotyping in vocational education, and (6) criminal offenders. In some states, data collection focused on counting the total number of students in each of the groups who were served by set-aside funds rather than the numbers of these students participating in the various occupational programs. State MIS are beginning to change in response to the 1990 Perkins Act priorities, attempting to collect program-level data for handicapped, economically disadvantaged, academically disadvantaged, and LEP students. However, change is often slow, especially when modifying the data collection procedures of dozens of local vocational education systems is involved.

While local recipients are able easily to count the number of students served by programs targeting special populations such as programs for single parents, displaced homemakers, and single pregnant women, many local recipients do not have the capacity to identify these students in the general population of the school or institution or in the context of general vocational course enrollment. Without being able to identify which students belong to the various special populations, even automated student record systems cannot produce occupational program-level information for these groups.

Although the Perkins legislation and associated regulations offer definitions for the various special population groups, these definitions do not always translate directly into procedures for identifying and classifying individual students. For example, the Perkins regulations define an individual with disabilities as "any individual with any disability as defined in . . . the Americans with Disabilities Act of 1990" (U.S. Congress, 1992). Generally, vocational educators at the secondary level classify any student who has an Individualized Education Program (IEP) as an individual with disabilities. At the

postsecondary level, however, the process is more complex. Knowledge of a student's handicap status may come from several sources, including student declaration of a disability on an application form, a referral from a vocational rehabilitation or other agency, or a voluntary assessment conducted by the institution. Some postsecondary institutions may use all of these and other sources of information to identify handicapped students, while others may rely primarily on one or two sources. Although some states provide guidelines for local recipients to use for identifying the various special populations, few monitor local procedures closely; and still others rely strictly on the definitions provided in the act and regulations.

Local vocational educators generally review the participation of students by sex and race/ethnicity during their program review process, usually conducted on a five-year cycle. Some local systems also regularly examine the participation of handicapped and LEP students, two of the groups included in OCR compliance programs. During the program review process, local vocational educators may compare the participation rates of these groups across occupational programs to see whether any programs enroll unbalanced numbers of these populations and to develop strategies for recruiting and retaining students.

OVAE plans to gather data from the states on the enrollment and completion of all special populations mentioned in the 1990 Perkins Act, for vocational education overall, and for specific occupational programs. Although some states will not be able to provide all of this information, OVAE's MIS will include all available data.

Most state performance measures and standards systems will include data on special populations. About half of the states have developed specific measures at each of the secondary and postsecondary levels for special populations in the areas of enrollment and access, retention and completion, and placement. However, only about half of the states will be able to disaggregate data on special populations for all their measures during the first year of implementation.

Program Offerings

OIS contain data on the number of recent graduates of vocational education and training programs in a state. Data on these program completers is maintained by program, by type of institution, and by substate region. This data is usually supplied to

SOICC from state MIS databases by the various state agencies offering vocational education.

Most state MIS databases contain information on vocational program completers. At the postsecondary level, data collection is driven by the Integrated Postsecondary Education Data System (IPEDS) requirements, which direct institutions to report the number of students completing certificates and degrees by vocational program area at the six-digit CIP level. For secondary education, program completion detail varies from the two- to six-digit CIP level. Some states employ their own program classification schemes, although many have developed crosswalks to the CIP for submitting data to OVAE in the annual performance reports.

As mentioned in "Describing Context and Trends," defining vocational program completion presents a particular challenge at the secondary level. While some states provide guidelines for determining completion status such as attainment of specified competencies, others leave the determination of completion to the faculty, school, or district. Consequently, procedures for counting vocational program completers vary across and even within states. The most common method of conferring completion status is based on course completion—that is, achieving passing grades in all courses offered as a sequence of courses in a particular vocational program area. Frequently, a sequence is made up of two or more consecutive courses, in some cases involving some sort of work experience component. In some school districts, particularly in rural areas, the entire sequence of courses may consist of a single course. Consequently, completion status, particularly at the secondary level, represents a broad range of occupational and related academic learning.

Most state MIS databases also contain information on enrollments in vocational education. However, these data are more troublesome than completion data for several reasons. As mentioned in the introductory chapter, students enroll in courses, not in programs. A particular course identified as being in one of the major two-digit CIP program areas may be part of two or more programs at the four- or six-digit level. Unlike program completion, which can be assigned after a student has completed a sequence of courses, enrollment cannot accurately be assigned to a program area below the two-digit level. However, many states collect and report enrollment data at the same level of detail as completion data.

Transcript data, which provides a longitudinal look at student coursetaking patterns over more than one year, permits assigning students to a program with a fair amount of accuracy. However, most states tally enrollment figures based on coursetaking in the current year only. Because students enroll in courses with varying goals and intentions, states' vocational enrollment figures are generally not valid indicators of "program" participation. Students may explore vocational education without any intention of completing a program. In fact, recent research indicates that almost all secondary school students and more than three-quarters of the students in public two-year postsecondary institutions take at least one course in the vocational education curriculum during their educational careers (Hoachlander et al., 1992). Consequently, program enrollment figures can fluctuate from year to year, although local fluctuations may cancel out when data is aggregated at the state level.

Many states attempt to deal with the problem of inferring program enrollment from course enrollment by dividing coursetaking into two levels: (1) exploratory, introductory, or nonoccupational courses and (2) occupational courses. Often states group consumer and homemaking education and industrial arts (i.e., technology education) courses and courses that introduce students to a cluster of occupations in the first category and reserve the second category for occupationally specific courses that are intended to lead to employment in a particular occupational field. However, the methods by which states assign courses to these categories vary widely. Furthermore, some states include students in grades nine through twelve in their count of vocational enrollments, while others include only those in grades ten through twelve or eleven and twelve. By including students in later grades only, states attempt to avoid counting nonoccupational courses.

Other states go one step further, assigning codes to courses based on the degree of certainty to which the course indicates enrollment in a particular program. For example, exploratory courses may receive a code indicating a relatively low degree of certainty that the student is actually enrolled in the program area of the course, while a higher-level course requiring as a prerequisite completion of previous courses in the sequence may receive a code indicating a relatively high degree of certainty that the student is actually enrolled in a particular program area. However, the number of states attempting to sort out program enrollment from course enrollment by this level of refinement is small.

Because students enroll in courses rather than programs, procedures for assigning program enrollment based on coursetaking force states to report enrollments either as duplicated or unduplicated counts. Unduplicated enrollments assign a single program area to each student, and provide a count of the number of students enrolled in vocational programs. Duplicated enrollments count students more than once if they took courses in more than one program area and provide a count of the number of program enrollments, which may be greater than the number of students being trained. While states with automated student record systems have the flexibility to produce either unduplicated or duplicated counts, other states may only be able to produce duplicated counts. Some states request from schools and institutions the total number of students enrolled in each course or program area but not individual student information, so the aggregate data cannot be unduplicated. Still other states request unduplicated total enrollments and enrollments by gender but collect only duplicated counts for the special populations.

Since students may fall into more than one special population category, aggregate enrollment information generally provides duplicated counts of the number of special populations enrolled in each program area. The sum of the number of handicapped, limited-English proficient, and economically disadvantaged students reported enrolled in a particular program area may be greater than the number of individuals who are members of special populations enrolled in that program area because students may belong to more than one of the targeted groups. In these cases, it may not be possible to produce an unduplicated count of the total number of special population students enrolled in vocational education in a state.

The practice of collecting and reporting program enrollments, rather than course enrollments, originated from the old Vocational Education Data System (VEDS) requirements and is perpetuated in OVAE's annual performance reports. The primary purpose of counting enrollments in vocational education is to estimate the size of the enterprise. As stated previously, unduplicated program enrollments provide information on the number of students being served, while duplicated program enrollments provide information on the number of program enrollments. However, given the problems in inferring program enrollment from coursetaking, neither of these measures of program enrollment provides accurate information on the number of students being trained or on the amount of training being offered in a particular field. The count of program completers provides a better indication of the occupationally specific training being

delivered nationwide. Perhaps a better measure of the size of the vocational education enterprise in any given year is simple course enrollment. A count of course enrollments or contact hours provides an indication of the amount of vocational training being delivered in various vocational fields and at various levels of coursetaking while avoiding some of the pitfalls of current program enrollment data.

OVAE's MIS plans to collect information from the states on program completion and program enrollment, both at the four-digit CIP level. As discussed above, a count of program completers, particularly at the postsecondary level, provides generally reliable information on the amount of occupationally specific training being delivered nationwide and is a rough indicator of the recent supply of trained labor in a particular field. In contrast, program enrollment information is much less meaningful at the four-digit CIP level. Because of the difficulties of assigning program enrollment based on coursetaking, it is sufficient to report program enrollment at the two-digit CIP level.

In addition to total enrollment and completion counts, OVAE intends to collect information for the various special populations and for programs other than the traditional occupational programs, including Tech Prep, cooperative work experience, apprenticeship, and work study. As mentioned above, the capacity of states to provide this type of information varies widely. The submission of data to OVAE is voluntary, so states will provide the data that is available. The MIS will accommodate the various state practices, for example, indicating whether a state's data is duplicated or unduplicated.

At both the secondary and postsecondary levels, at least half of the states have implemented a measure of retention or completion in their performance measures and standards systems (Rahn et al., forthcoming). At the secondary level, about one-third of the states are measuring the percentage of vocational students who are retained in or complete a vocational program, and one-third are measuring the percentage of vocational completers who graduate from high school. A smaller number of states is measuring the decrease in number of dropouts. At the postsecondary level, about one-half of the states are measuring the percentage of vocational students who are retained in or complete a vocational program, and a small number is measuring the decrease in number of dropouts.

Most states that are measuring enrollment include access for special populations. About half of the states at both the secondary and postsecondary levels have implemented a measure of enrollment specifically for special populations. A handful of states is measuring the percentage of all students enrolled in vocational courses at either the secondary or postsecondary level, and one is implementing a measure of attendance at the postsecondary level.

Accomplishments

Some OIS contain information on the wages and benefits of specific occupations. This information is mostly obtained through surveys of employers, asking, for example, what the standard entry-level wages and benefits are for specific occupations. A few states are contemplating including actual rather than estimated information based on wage record data obtained through the State Employment Security Agency (SESA). Wage record data can provide the actual average earnings of recent program participants, rather than employers' stated pay levels and can be reported separately for various demographic groups and for various substate regions. Some SOICC staff believe this provides more relevant information for students anticipating entering the labor market and for prospective students considering in which program or institution to enroll.

Many local and state vocational educators examine placement information as part of the program review process. Educators want to know whether program completers found employment, whether they found employment in a field related to their training, and whether different types of students had various labor market experiences. They also want to compare placement rates of the different programs to determine which programs have been more or less successful in placing students. A review of placement information often leads to developing strategies for improving the placement of students or of certain groups of students, to increasing recruitment efforts for attracting students to programs with high placement rates, and sometimes to removing less successful programs.

Procedures for collecting placement data vary widely across the states. Some states leave data collection to local schools and institutions, with some of these states collecting the resulting information at the state level, and others not doing so. Other states collect their own placement data in addition to and separately from local efforts, while still others collect the information on behalf of local providers, distributing the

relevant data to them. At the local level, data collection may be the responsibility of a central office, or individual program faculty may follow up on their own students. Most current data collection efforts rely on either phone or mail surveys of former program participants, with some states and locals surveying employers either in addition to or in lieu of participants. Some locals and states gather information on placement in further education and training as well as on entry into the labor market. Many follow-up surveys track the placement outcomes of program completers only, while others track program leavers as well as completers.

The quality of placement data also varies widely. Surveys conducted by phone, and by mail in particular, are notorious for producing response rates sometimes as low as twenty-five to thirty percent. The main problem with low response rates is that they usually indicate nonresponse bias; that is, the former participants who respond may be different from those who do not respond in ways that are important to the survey. Frequently, the lowest response rates in a state come from school districts and postsecondary institutions in urban areas, suggesting that this placement data may be biased against special populations. Former participants who return a mailing asking questions about employment are more likely to be employed than those not returning the mailing. Administrators who base program decisions on this data may be drawing incorrect inferences from the responses received.

In order to improve the quality of the data collected, as well as to decrease the costs of and duplication of effort involved in collecting placement data, some states are using or are contemplating using SESA wage record data. While this data has its own limitations as described in "Monitoring Program Compliance," it generally provide a reliable and cost-effective means of gathering information on employment and earnings. When combined with other administrative databases such as federal civilian and military employment and two- and four-year postsecondary institution enrollment databases, wage record data can provide a powerful source of information on the placement of former vocational/technical students.

OVAE's MIS plans to collect data from the states on the placement of former program participants in further education, the military, and related and unrelated employment. The data will be requested at the four-digit CIP level. As described above, the capacity of states to generate this information will vary.

By design, the performance measures and standards systems are outcome based and therefore include a number of measures of both learning and labor market outcomes. Virtually all the states have implemented a measure of academic gains since such a measure was required explicitly by law at each of the secondary and postsecondary levels. At each of the levels, about two-thirds of the states have implemented a measure of occupational skills attainment, and about one-third have implemented a measure of job or work skills attainment. A much smaller number of states are measuring occupational skills and job or work skills gains. In terms of labor market outcomes, most states at each of the secondary and postsecondary levels have implemented a placement measure, usually including placement in further education, the military, and related and unrelated employment. A small number of states have implemented measures of employer satisfaction and earnings.

Personnel

While most states maintain information on faculty in central personnel files, the amount and accessibility of information on vocational faculty varies by state. At the secondary level, most states can identify vocational teachers based on certification or credential information. At the postsecondary level, the distinction between vocational and nonvocational faculty is not always drawn, and data on faculty must be sorted by program affiliation, where available, in order to identify vocational faculty. In some states, the information available on faculty may be limited to basic demographics such as sex and race/ethnicity or educational and work history. However, some state agencies collect additional information on course or section assignments from school districts and postsecondary institutions, and some also collect information on faculty supply and demand. The advantage of general faculty databases is that they allow a comparison between faculty with and without vocational teaching responsibilities.

In contrast, some state agencies responsible for vocational education collect and maintain separate information on vocational faculty. In some cases, these agencies collect information that may not be available through the general state agency, including primary teaching assignment, course responsibilities, and class sizes; and in other cases they may duplicate data collection efforts. Some of these agencies also collect information on other staff with vocational education responsibilities. In these states, the amount of information available on vocational faculty may be enhanced, although the capacity to compare vocational and nonvocational faculty may be limited.

OVAE's MIS plans to collect data from the states on the current number of and future need for vocational faculty at the four-digit CIP level. As described above, states have varying capacities to provide this information. At the secondary level, most states can provide the total number of vocational faculty as well as the number certified in various program areas. Those states that collect course assignment information will be able to assign faculty to program areas using procedures similar to those discussed for assigning students to program enrollment areas. At the postsecondary level, institutions generally maintain data on faculty at the two-digit level for IPEDS, although those states that collect course assignment information could provide more detailed information. Some states will not be able to provide any data on the future need for faculty.

Facilities and Equipment

Most local vocational providers and states do not maintain comprehensive information on facilities and equipment used for vocational education. As discussed in "Monitoring Program Compliance," local providers do maintain information on the uses of Perkins funds, and most can provide a detailed accounting of the equipment purchased with these funds. However, an attempt to calculate the total amount of facilities and equipment devoted to vocational education would require estimating a prorated amount based on some known quantity of vocational education. For example, facility space could be assigned based on the proportion of contact hours that were associated with vocational courses.

Costs

As mentioned in the "Describing Program Practices" and "Monitoring Program Compliance" sections, some school districts maintain separate budgets and expenditure records for vocational education, including information on salaries and supplies, and some postsecondary institutions do so for each department. This information is generally not kept at the state level. Furthermore, the information may not include capital expenditures, which often cannot be assigned strictly to vocational education. In order to estimate the overall costs of vocational education, capital expenditures would have to be prorated in a similar fashion to facilities and equipment.

Summary of Data Availability

As mentioned earlier in this section, the primary purpose of performance monitoring systems is local and state program improvement. While this data may also provide national-level policymakers and program managers with useful information, the data is limited in several important ways: (1) it lacks comparability across and within states, (2) its quality is questionable in certain cases, and (3) it lacks consistency over time. Consequently, while contributing texture to what is known about the performance of programs at the local and state levels, this data should not be used to produce statistically rigorous national estimates.

Lack of Comparability Across and Within States

All of the systems described in this section, including OIS, MIS, and performance measures and standards systems, are subject to variations in state and even local practices. Variations can be found in the types of providers and programs included in the system, procedures for identifying and classifying special population students, definitions of program completion, procedures for counting program enrollments, capacity to provide duplicated and unduplicated counts, procedures for collecting placement data, the types of information available on vocational faculty and other vocational staff, and the number and types of performance measures and standards. Appendix B summarizes the findings from the site visits conducted for this study regarding the comparability of local and state MIS data collection.

National databases, including OVAE's MIS, that attempt to compile data from these state systems must exercise caution when comparing data across states. In order to provide truly useful information that contributes to an understanding of the performance of vocational programs at the local and state levels, such databases must include a description of the varying state practices relevant to the data elements included in the system. While most states would welcome guidance and technical assistance from federal agencies in collecting and analyzing their data, this involvement must leave room for differences in state needs and in constraints regarding vocational education data.

Data Quality

In some cases, the quality of the data collected by states is questionable. First, as discussed previously, since students generally enroll in courses rather than programs,

enrollment cannot accurately be assigned to a vocational program area below the two-digit CIP level. Furthermore, the validity of the entire process of inferring program enrollment from coursetaking in a single year is questionable. Second, placement databased on low response rates to phone and mail surveys and other studies may be subject to significant nonresponse bias. Federal agencies can provide valuable assistance to the states by offering guidance on data collection and reporting strategies that produce high quality data on vocational education.

In other cases, the quality of local data is unknown. State vocational education agencies are not always aware of local data collection and reporting practices and of the quality of the data submitted to them. While local data is generally considered to be more accurate and reliable when it is used to distribute state or federal funds or when they are relevant to local uses and needs, these judgments are more frequently based on speculation and anecdotal evidence than on systematic studies. More attention needs to be paid to local data quality if state MIS are to be relied upon to provide useful and accurate information.

Lack of Consistency Over Time

Even seemingly simple changes in data collection procedures can produce large variations in performance data. For example, course enrollment counts are very sensitive to the timing of data collection. Shifting the date for counting enrollments by even one or two weeks can cause a large increase or decrease in the numbers reported. Changes in data collection procedures occur for a variety of reasons, including both administrative and programmatic reasons, and they occur at both the local and state levels. Since vocational education is part of the larger education enterprise, changes in general data collection may affect vocational education data. State- and national-level databases must keep track of changing data collection procedures if variations in performance data over time are to be interpreted correctly.

Performance Measures and Standards

Although subject to many of the above comments, state performance measures and standards systems present additional challenges. Unlike state OIS and MIS, which have been in existence for some time, these accountability systems represent largely new endeavors at collecting and analyzing data for vocational education. Some states'

systems of performance measures and standards rely on data collection strategies that were in existence prior to the 1990 Perkins Act, and that were already part of state MIS. However, the 1990 accountability requirements compelled most states to re-examine their data collection efforts and many to develop wholly new strategies. Furthermore, while many states already collected some performance data, few had established vocational education standards.

Because of the newness of these systems, there is an ongoing need for technical assistance that will help states evaluate and improve the systems implemented in fall 1992. Specifically, the department could assist states with (1) further development of performance measures, (2) definition of standards, (3) student assessment, and (4) adjustments and incentives for serving special populations.

Measures

The law requires that states develop measures of learning and competency gains and explicitly states that these must include measures of student progress in the achievement of basic and more advanced academic skills. Implicit in this language is the requirement that states must also include measures of gains in occupational skills, although the law does not clearly say so. Nevertheless, given that one of the primary purposes of vocational education is preparing students for employment, measures of occupational competency are clearly a desirable component of the accountability system.

As important as measures of occupational competency may be, most states have encountered serious difficulty in developing appropriate measures. Occupational competency testing is neither as widely developed nor as rigorously standardized as academic achievement testing. Moreover, there is not yet widespread consensus on what types of occupational competencies should be assessed, on what skills reflect an understanding of "all aspects of a given industry," or on how these skills should be tested. Consequently, the federal government could provide valuable help to localities and states through supporting the development of occupational assessment and by training educators in how to conduct more effective assessments of occupational knowledge and skills.

A key word in the law's language is "gains," evidence that participation in vocational education leads to an increase in knowledge and skills. There are at least two

approaches to measuring gains. First, some form of pre- and posttesting can be used. This method is student-based and assesses changes for individual students in knowledge and skills over some specified period of time, for example, between fall and spring or between eighth grade and eleventh grade. Second, gains can be measured programmatically over time. Such an approach averages scores of students participating in a program at one point in time and compares this average with an average from an earlier period to determine whether scores have improved. While the first approach pre- and posttests the same students, this second approach typically tests different students. This latter approach requires statistical controls for changes in student characteristics and in other variables external to the program that may influence achievement.

The measurement of gains is a topic that confuses many states. Technical assistance that helps states to clarify how to define and measure gains would greatly improve the accountability systems developed to date.

In contrast to gains, one can also measure learning *attainment*, the actual level of competency (occupational or academic) that a student has mastered. Competency attainment and job or work skill attainment are two of the four options states have in developing their second set of required performance measures. This is another area in which states will continue to need help.

Standards

While all the states appear to have made substantial progress in identifying and defining performance measures, establishing standards for these measures has proven more difficult. Most states have used existing data (or will use baseline data from the first year of operation) to set standards. For example, a state might set a standard for academic achievement based on the statewide average test score for students participating in vocational education programs. Whether such a standard bears any relationship to requirements of the workplace or to further education opportunities is, for the most part, unknown.

Ideally, standards should reflect valid requirements for performing effectively in the workplace or for succeeding in further education or training. The few states that have developed competency-based curricula and rigorous occupational competency testing and certification procedures have sought to validate competencies and standards through

employer involvement. Even in these states, however, there have been few true tests of the validity of these assessments.

Nationally, the U.S. Department of Education and the U.S. Department of Labor are sponsoring a variety of projects charged with developing national industry standards in such fields as allied health, electronics, printing, and environmental technology. A few states have undertaken their own studies of industry standards. How fruitful these efforts will be remains to be seen. If they are successful, their findings will need to be incorporated into the state standards that are part of the accountability systems. How best to accomplish this incorporation is another topic for technical assistance.

Student Assessment

In many respects, these systems of measures and standards are only as good as the assessment instruments used to gauge students' competency gains and attainment. At the secondary level, most states administer statewide student achievement tests of reading and math. Typically, states are using these tests to assess gains and attainment in academic skills to satisfy the 1990 Perkins Act requirements. While this approach is a good first step, it leaves much to be desired. None of these tests has been designed to assess students' abilities to apply academic concepts in work settings. Few, if any, are competency-based; and most are not administered in grade twelve, making accurate measures of gains difficult. At the postsecondary level, widespread uniform testing of students' academic knowledge and skills is much less routine. Developing good measures of academic attainment and gains for postsecondary students has, therefore, been more problematic.

At both the secondary and postsecondary levels, there is relatively little assessment of occupational knowledge or competencies. Widely accepted, validated tests of occupational competencies do not yet exist. Moreover, there is no strong consensus about what kinds of occupational competencies should be measured. Existing competency tests tend to focus on rather specific occupational skills rather than some of the more generic skills that have been promoted by recent national commissions and several researchers.

There are several interesting efforts underway to develop better tests of occupational competencies and related academic skills. Some of these efforts are

concentrating on designing standardized, paper-and-pencil tests. Others are attempting to develop a more performance-based approach to assessment, experimenting with portfolios and other types of graded and ungraded performance testing that use simulations or actual performance demonstrations to measure student proficiency.

At a minimum, locals and states will need information about what kinds of instruments have been developed, their advantages and disadvantages, and the kinds of educational settings for which they are best suited. The Department of Education could support a clearinghouse on assessment, as well as sponsor regional workshops on the use and interpretation of new assessment instruments. The federal government may find it desirable to support the development of particular assessment instruments such as tests of work readiness or computer-simulated assessment.

Special Populations

Section 115 of the 1990 Perkins Act requires that the accountability systems include "incentives and adjustments that are designed to encourage service to targeted groups or special populations." Federal law and regulations provide no guidance on what these incentives and adjustments should be or on how they should be incorporated into accountability systems. To date, most states have postponed making specific adjustments to their proposed measures and standards or introducing incentives. Satisfying this requirement can involve rather complex quantitative analysis and other kinds of technical expertise that is not routinely available in many states. Ensuring that this requirement is addressed fairly and effectively will probably require technical assistance to the states.

CONCLUSIONS

Design of a Multiform System

As stated in the 1990 Perkins Act, a national vocational education data system should serve two primary functions by providing information relevant both to policymaking and to program management. In order to meet these needs, national data must address four subsidiary functions described in the second through fifth sections of this report: (1) describing context and trends, (2) describing program practices, (3) monitoring program compliance, and (4) monitoring program performance. Each of

these four functions serves different purposes and requires different data collection strategies. But the functions are not mutually exclusive, and data that serves one function may be useful in another. Data for all four functions may be used to establish federal policy and to manage programs. However, the four functions are sufficiently distinct that one must guard against the temptation to design a single system that will simultaneously meet the requirements of all four. The distinct requirements of these functions argue for a multiform system of vocational education data collection rather than a single, uniform design that will address all concerns.

Data describing the context of vocational education and trends and changes over time allow policymakers and program managers to assess the general evolution of vocational education nationally. This data provides information necessary for program planning, setting priorities, targeting resources, and identifying areas requiring new direction and leadership. Data describing context and trends requires a high degree of uniformity and comparability over time, although it does not need to be collected frequently. This data should not be collected in isolation from other types of experience. Compared to universal censuses or elaborate experimental designs, national sample surveys are relatively low-cost, low-burden strategies for producing accurate national estimates of key context and trend variables. Responsibility for administering these surveys has been lodged with federal agencies experienced in national statistics.

Ongoing, national statistical surveys cannot, however, answer many important questions about vocational program practices. Surveys designed to provide consistent information on context and trends over time cannot assess the impact of many major policy initiatives. Understanding how states and local schools and institutions responded to the 1990 Perkins initiatives, for example, requires studies specially tailored to assessing these responses. Such studies typically are not the responsibility of the statistical agencies but of agencies charged with evaluation, implementation, and research. Special studies endeavor to describe vocational program practices thoroughly at a particular point in time and to capture variations in local and state approaches. They are less well-suited to assessing the long-term impact of policy on student outcomes. For instance, policymakers cannot expect the current National Assessment of Vocational Education (NAVE) to detect changes in student outcomes resulting from the 1990 Perkins initiatives. The national statistical surveys, as well as additional special studies and research, will be able to contribute to assessing these longer-term impacts.

The agencies overseeing the implementation and administration of federal policy for vocational education are responsible for monitoring whether states and local recipients of federal funds are in compliance with various federal requirements. Monitoring compliance requires that information supporting this function be maintained (although not necessarily reported) by all those who are accountable. While the actual collection of data to assess compliance may rely on sampling techniques, data must be maintained by the universe of recipients of federal funds. Since collecting and maintaining universal data can be extraordinarily costly and burdensome, extreme care must be taken in defining the parameters of data needed for this function as well as the extent to which locals and states will be required to report information rather than simply maintain it.

Finally, educators and policymakers at all levels are concerned with what vocational education accomplishes, including both learning and labor market outcomes. To assess program performance, local and state educational agencies and institutions have developed and continue to refine a variety of data systems designed to yield information on how well vocational education is performing. The primary purpose of these performance monitoring systems is local and state program improvement. As such, these data systems reflect the diversity of local and state needs and circumstances and are not well-suited to providing uniform national data on program performance. Because definitions and methods of collection vary, local and state systems cannot yield information that can be aggregated across states to produce national estimates on the performance of vocational education. Efforts to impose greater comparability and uniformity on these systems risk undermining their primary purpose. While national estimates of program performance are certainly desirable, these will best come from other sources such as national statistical surveys and special studies.

Design of a national vocational education data system needs to keep these various functions in mind. Each contributes something different to what is known about the enterprise and is subject to different limitations.

Setting Priorities for National Data Collection

Considered together, the four functions of vocational education data produce a wealth of information on the vocational education enterprise, yet none is sufficient in itself to address all policymaking and program management concerns. Even as a whole, the existing multiform system does not provide all the information that is desired on vocational education. The "Describing Context and Trends," "Describing Program Practices," "Monitoring Program Compliance," and "Monitoring Program Performance" sections described the data that is available through each function. The chart on the following pages summarizes briefly the sources of available information for the seven primary areas of policy and management concern. In some cases, relatively simple modifications are needed to improve the availability of information; while in others, improvements may require substantial effort.

The process of setting priorities for modifying existing data collection efforts and collecting new data should be based on two criteria: (1) importance of the data for policymaking and program management and (2) cost. This section of the report establishes priorities based on the importance of the data and discusses broad cost concerns. However, evaluating the precise cost of the many possible data improvement strategies goes beyond the scope of this study and is better left to the responsible federal agencies.

Based on their importance for policymaking and program management, the priorities for national vocational education data collection include information on the following broad categories:

- Organization and governance
- Student participation
- Program offerings
- Accomplishments
- Faculty

Information on the oversight of vocational education and the structure of the delivery system in each state facilitates national data collection efforts as well as communication among the local, state, and federal levels. Specifically, information on governance and

organization contributes to an understanding of how federal policy is implemented at the local and state levels and enables vocational education administrators at all levels to assist in improving programs. Data on student participation and program offerings answers questions about the scope of the vocational education enterprise. Who participates in vocational education? What programs are offered? How much vocational education do students take? Data on accomplishments, including learning and labor market outcomes, provides information on how well vocational education is meeting the needs of students and, more broadly, of business and industry. Data on faculty, including information on instructional strategies, describes perhaps the most important resource in the vocational education system.

These categories of information should be given the highest priority in a national data system because they act as important indicators of the effectiveness of federal policy and of the need to improve programs. Data on accomplishments provides the most direct indication of the effectiveness of policies and programs, offering evidence of the amount and types of student learning and of students' subsequent employment, education, and training experiences. While not describing outcomes per se, data on student participation and program offerings provides information on access to and progress in vocational education for various groups of students, and data on faculty can potentially be linked closely with student outcomes and program performance. Information on the governance and organization of vocational education describes the context in which all of these forces work.

Of lesser priority for a national vocational education data system is information on the following categories:

- Administrators
- Facilities and equipment
- Costs

While data on each of these subjects contributes additional and interesting information on the vocational education system, it is less important as an indicator of the effectiveness of policies and programs. In contrast to the priority areas listed above, data on administrators, facilities and equipment, and the costs of vocational education provides information primarily on inputs into the system, rather than on the system's outcomes.

Where data on student accomplishments or participation, for instance, indicate a problem or a success in the system, further investigation may lead to one or more inputs as the underlying cause. However, given limited resources at the federal level, a national vocational education data system should focus on collecting information that indicates the health of the system rather than on the myriad factors contributing to failures and successes.

The above discussion provides broad guidelines for setting priorities for modifying existing data collection efforts and collecting new data. "Describing Context and Trends," "Describing Program Practices," "Monitoring Program Compliance," and "Monitoring Program Performance" described in detail the problems that can be addressed and the gaps that can be filled to improve available data in the five priority areas. While the responsible federal agencies must decide upon the specific strategies to pursue, they should pay particular attention to two recurrent themes emerging from this study.

First, the existing multiform system is severely limited in its ability to provide information on the vocationally relevant learning outcomes of students, specifically on their occupational competencies, applied academic skills, work readiness skills, and understanding of all aspects of the industries they are preparing to enter. The national statistical surveys, special studies, and systems of performance measures and standards are all impeded in collecting and reporting this information because of the lack of appropriate assessment instruments and, more fundamentally, because of the lack of consensus on what types of skills should be assessed.

Second, a recurring problem across all types of data collection is incomplete coverage of the vocational education enterprise. The national statistical surveys and special studies vary in their ability to provide information on vocational programs offered through the various types of school and institutional arrangements. The surveys also do not always capture the full range of experience of students participating in vocational education (including the various reasons why students participate and whether they achieve their personal goals) or the full range of vocational programming. Data collected for compliance and program monitoring purposes varies in its capacity to describe nonfederally funded programs in addition to federally funded ones. While it would be inefficient for all data collection activities to attempt to answer all questions and while

some vocational education pursuits may be too uncommon to warrant federal funds, there is certainly room for improving the coverage of such a diverse enterprise.

Table 1

Summary of Data Sources

	Describing Context and Trends	Describing Program Practices	Monitoring Compliance	Monitoring Program Performance
Organization and Governance	Secondary level – CCD Postsecondary level – IPEDS, NSOPF, NPSAS, NHES, CPS	OPBE – study of vocational education systems and facilities NCRVE – studies of education and training for work and strategies for linking planning and evaluation	OVAE – state plans	OIS – State Training Inventories MIS – state systems
Student Participation	Women, Indians, Minorities – HS&B, NAEP, NELS:88, NLS-72, IPEDS, CPS, NPSAS Individuals with Handicaps – HS&B, NAEP, NELS:88, NLS-72, NPSAS, NLTS Individuals of Limited English Proficiency – NELS:88, NAEP Economically Disadvantaged Students – HS&B, NELS:88, NAEP, NLS-72, NPSAS Single Parents – HS&B, NAEP, NELS:88, NLS-72, NPSAS, CPS Incarcerated Youths and Adults – NALS, Surveys by Bureau of Justice Statistics, Federal Bureau of Prisons, Office of Juvenile Justice and Delinquency Prevention	NAVE – omnibus surveys, case studies, study of funding distribution, correctional surveys, and analysis of HS&B, NAEP, NELS:88, SASS (secondary level); NPSAS, BPS (postsecondary level)	OVAE – state plans State Vocational Education Boards – local applications OCR – civil rights compliance programs and survey	MIS – OVAE and state systems Performance measures and standards systems

Summary of Data Sources (cont.)

	Describing Context and Trends	Describing Program Practices	Monitoring Compliance	Monitoring Program Performance
Program Offerings	Secondary level – HS&B, NAEP, NELS:88, NLTS Postsecondary level – IPEDS, CPS, NPSAS, BPS	NAVE – omnibus surveys, case studies, survey of vocational student organizations OVAE – performance measures and standards study NCRVE – surveys of performance measures and standards implementation and study of their effects PES – tech-prep evaluation	OVAE – state plans State Vocational Education Boards – local applications OCR – civil rights compliance survey	OIS systems MIS – OVAE and state systems Performance measures and standards systems
Accomplishments	Secondary level – HS&B, NAEP, NELS:88 Postsecondary level – NLS-72, HS&B, BPS, SIPP	NAVE – analysis of NAEP, NELS:88, NLTS, SIPP; study linking unemployment insurance and student data; employer survey	SESAs – wage record information	OIS systems MIS – OVAE and state systems Performance measures and standards systems
Personnel	Secondary level – SASS Postsecondary level – NSOPF	NAVE – omnibus surveys, case studies, analysis of SASS, FRSS, NSOPF	OVAE – state plans State Vocational Education Boards – local applications OCR – civil rights compliance programs and survey	MIS – OVAE and state systems
Facilities and Equipment		OPBE – study of vocational education systems and facilities	State Vocational Education Boards – local applications Local recipients – accounting of equipment purchased with Perkins funds	
Costs of Vocational Education		OPBE – study of vocational education systems and facilities NCRVE – study of education and training for work NAVE – omnibus surveys, case studies, study of funding distribution	OVAE – distribution of Perkins funds to states State Vocational Education Boards – distribution of Perkins funds to local recipients Local recipients – expenditures of Perkins funds	Local providers – vocational education budgets, estimates based on prorating procedures

Given limited resources, federal agencies cannot be expected to remedy all of the problems identified in this study. Keeping in mind the priorities outlined above, the responsible agencies will need to weigh the relative cost of the many improvements that can be made against the value of the information those improvements will produce. The National Center for Education Statistics (NCES), for example, must decide whether it is a better use of funds to correct the undercount of area vocational schools in the Common Core of Data (CCD) or of proprietary institutions in the Integrated Postsecondary Education Data System (IPEDS); to expand the National Survey of Postsecondary Faculty (NSOPF) to include proprietary institutions and vocational/technical institutes; to increase the sample size of Asians and Native Americans included in the National Assessment of Educational Progress (NAEP) or longitudinal surveys; to enrich the Beginning Postsecondary Students (BPS) survey by developing a related institutional survey examining the relationship between teacher qualifications, experience, instructional strategies, and student outcomes; or to undertake another of the number of modifications that could be made.

Generally, high payoff strategies for improving vocational education data involve: (1) increasing coordination among and within federal agencies, particularly with regard to the content and timing of various data collection activities and the definitions and measuring procedures used by the various agencies and (2) providing technical assistance to local and state vocational education providers, particularly with regard to the compliance and program monitoring functions, in order to improve the quality of the data they collect and report. Beyond these two strategies, the options available to the various agencies are many. Some represent relatively inexpensive adjustments to existing data collection, while others are more costly.

Among the more costly improvements to the existing system would be collecting comprehensive information on the condition of facilities and equipment and the costs of vocational education. The former involves collecting new information on numerous and ever-changing techniques specific to a large number of vocational programs, possibly requiring independent on-site verification rather than self-reporting. The latter involves piecing together vocational expenditures information from local, state, and federal sources and applying some sort of estimating procedure where the information is not available. Since these two categories of information are also less important for providing

information for policymaking and program management, they should fall near the bottom of a final priority list.

At times, however, the importance and cost of a specific improvement may point to different conclusions. For example, while efforts to improve information on student outcomes in the areas of occupational competencies, applied academics, work readiness, and all aspects of the industry are at the top of the priority list in terms of their importance for policymaking and program management, developing appropriate assessment instruments will require substantial resources and could prove quite costly. Therefore, the relevant federal agencies will need to determine the most appropriate role they should play in this process.

The decisions that federal agencies will need to make are difficult and complex. This report identifies problem areas, suggests strategies for addressing those problems, and lays out broad guidelines for establishing priorities; but the responsible agencies will need to make the final decisions about what actions to take.

Conclusions

The existing multiform system already provides substantial information on vocational education. Improving national vocational education data requires strengthening this system, rather than restructuring or dismantling it. The following is a list of the final conclusions from this study that should guide future efforts to improve national data collection for vocational education:

- It is important to maintain the distinction among the four functions of national data described in the "Describing Context and Trends," "Describing Program Practices," "Monitoring Program Compliance," and "Monitoring Program Performance" sections of this report and to recognize that a uniform system cannot meet all national data needs.

- It is important not to try to meet multiple objectives with a single data collection strategy. For example, data collected for local program improvement purposes cannot be used to produce national statistical estimates, and special studies designed to assess local and state responses to the Perkins legislation cannot be expected to produce information on the long-term impact of policy initiatives on students.

- Careful attention should be paid to deciding when new data collection should be institutionalized or when special one-time studies of vocational education are

more appropriate. Similar attention should be paid to the extent to which local and state providers are required to report, not just maintain, information on vocational education. Data should be collected in the broader context of general education where possible.

- With the exception of some compliance information, data on vocational education does not need to be collected at the national level more frequently than once every four or five years.

- The federal agencies responsible for collecting data on vocational education should establish a formal system for reviewing the vocational content of national surveys and studies. Furthermore, some sort of ongoing structure needs to be developed for addressing issues related to agency collaboration, timing, definitions, and common measuring procedures. The Department of Education may want to consider establishing a permanent advisory group similar to the Professional Working Group assembled for this study.

- Efforts to refine the existing vocational education data system should be integrated with other national data-related activities such as the movements to develop teacher certification and business and industry standards.

- Efforts should be made to communicate to the broader education community the types of information on vocational education that are available at the national level and the sources and locations of that data.

Producing good national data on vocational education is an ongoing challenge. The history of congressional mandates to collect this data has been a series of attempts that assume that uniformity can be obtained from an enterprise that is extraordinarily diverse. In responding to the mandate of the 1990 Perkins Act, what is needed is not a new independent, centralized vocational education data system. Much more desirable are efforts to strengthen the existing multiform system. Information on vocational education can be improved largely by concentrating on fine-tuning existing and planned data collection with attention to improving timing, eliminating inconsistencies, and taking advantage of low-cost opportunities to collect additional data. Also needed is an ongoing process for identifying gaps in information and for deciding who is in the best position to fill them. Finally, while data collection should remain decentralized, it is desirable to increase the level of coordination within and among the responsible federal agencies. This report offers general guidelines and strategies for piecing together a more comprehensive picture of vocational education at the national level.

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APPENDIX A

DATA MAP FOR NATIONAL SURVEYS

Table A1

Overview of Datasets Containing Vocational Education Data

Database	Earliest/ Latest Data	Periodicity & Longitudinal/ Cross sect(CS)	Education Levels		Data Elements and Approx Sample Size				Other Sample Chars	Voc Program Participation Crse/Prog Identification
			Sec	PSE	Students	Faculty	Admin'trs	Inst'ns		
NAEP-survey	1969/1990	Annual/biennial (+)	X		30,000/grd	of some stds	Grd4:750; 8:600, 12:500		Pb/pr grd 4/8/12	Sems of voc/bus crses grds 9-12
NAEP-trans	1987/1990	Ev 4 yrs (+)	X		23,000	—	--	433	Pub/pri grd 12	Sec courses taken (6 digit CIP)
HS&B-82 surveys	1980/1986	Longitudinal (+)	X	X	15,000	—	300-400	1,000	Public/private	PSE major(s) (6 digit CIP)
HS&B-82 HStrans	1982	Longitudinal	X		16,000	—	—	1,000	Public/private	Sec courses taken (6 digit CIP)
HS&B-82 PSEtrans	1982/1986	Longitudinal		X	6,100	—	—	1,000	First 4 yrs out	PSE courses taken (6 digit CIP)
HS&B-80 surveys	1980/1986	Longitudinal	X	X	12,000	—	300-400	1,000	Public/private	PSE major(s) (6 digit CIP)
HS&B-80 PSEtrans	1980/1984	Longitudinal		X	7,800	—	—	—	Imm entrnts/4yrs	PSE courses taken (6 digit CIP)
NLS-72 surveys	1972/1986	Longitudinal	X	X	22,600	—	—	1,000	Public/private	PSE major(s) (6 digit CIP)
NLS-72 PSEtrans	1972/1979	Longitudinal		X	14,800	—	—	—	First 7 years out	PSE courses taken (6 digit CIP)
SASS el/sec tchrs	86-87/87-88	CS/some long (+)	X		—	68,000	12,800	12,800	El/sec Pub/pri	El/Sec subjects taught (2 digit CIP)
NSOPF PSE faculty	1987-88	CS 92-93 (+)		X	—	8,400	2,400	420	Nonproprietary	Main PSE teaching field (4 digit CIP)
IPEDS PSE Institts	69-70/89-90	Annual (+)		X	—	—	—	10,900	Universe of inst's	Programs offered (6 digit CIP)
IPEDS enroll/deg	1967/1990	Annual (+)		X	All in schools	—	—	5,000+	<4 yrs—grad schs	Deg/cert (6 digit CIP), enrollments
IPEDS Occ-Spec	1987/1989	Biennial (+)		X	All in progs	—	—	4,000	Less than 4 yrs	Enrollments in occ-specific progs
CPS Curr Pop Sur	1969/1990	CS/ev 3-4 (+)		X	58,000	—	—	—	Civilian, noninst	If taking voc courses, by provider
NELS-88	1988/1990	Long/biennial (+)	X	(+)	24,600	5,200	—	1,000	1992 high schl srs	High school transcripts after 1992
NPSAS-PSE Aid	86-87/89-90	CS/ev 3 yrs (+)		X	34K/47K	—	—	1,100	Has proprietry insts	Major PSE field (6 digit CIP)
BPS-Beg Postsec	89-90/91-92	Longitudinal (+)		X	7,900	—	—	1,000	From NPSAS90	Major field each term (2 digit CIP)
NHES-Hshld Ed	1991	CS		X	60,000 hshlds	—	—	—	Individual participation in all types of adult education	
NLTS-Special Ed	85-86/	Longitudinal (+)	X	(+)	8,000	—	—	103 districts + 22 special ed schools		High school course records
NAVE-Corrections	Juv/Ad-1993	?	X	X	?	?	J:400/A:50	J:400/A:50	J: All/A: largest	Juvenile: less info/Adult: more

— Data not available in this dataset

(+) More data collection planned in future

? Unknown until field tests and survey development

*Not analyzed

Table A2

Quality and Type of Information on SEC. 421 (c)(1) Areas of Data Sets

Database	Teachers	Administrators	Students	Facilities	Equipment
NAEP	Demos: math/science tchrs of stds >10% missing in 1990 grade 8 No 1990 grd 12 teacher vars	Principal, school demos. Missing >10% in 1990 grades 8,12	Demos, attitudes, math/reading/ science items, scores	Types of science labs	Number, of PC's PCs in classroom or elsewhere
HS&B-82 Seniors Soph cohort	All teachers: demos, field, methods, attitudes	Principal, demos, school climate Voc Ed. Coord. No courses by subj. goals, training eval of tchrs use of tests, inst materials voc ed completers, outcomes	Demos, ed, work, family history, attitudes 1980-86	Voc ed training by 7 subjects occurs in high school or elsewhere	Voc ed training on: electronic aids diagnostic micros mainframes, CAD computer-controlled machines Year computers first available
HS&B-80 Seniors Senior cohort	Voc teachers: time in instruction methods, finding jobs for students, student information		Demos, ed, work, family history, attitudes 1980-86	—	
NLS-72 Seniors	—	—	Demos, ed, work, family history, attitudes 1972-86	—	—
SASS el/sec tchrs	Demos, teaching exper, history, field, pay, conditions, attitudes	Ed background, teaching field, demos	Demos agg to school-lev only	—	—
NSOPF PSE faculty	Demos, ed, field, experience, tasks, workloads, benefits, attitudes	By dept & inst: demos, rank of ft/pt faculty-tenure, benefits	—	—	—
IPEDS PSE Inst	—	—	—	Types of off campus facilities used	—
IPEDS Libs/Financ	—	—	Demos, current enrolls, degs	Libraries; library holdings	Library equipmnt $, physical plant $
IPEDS Fall Staff	Occ categories, tenure, not field	Number by gender, race	—	—	—
IPEDS Occ-Spec	—	—	Enrollments in some occ fields	—	—
IPEDS enroll/deg	—	—	Demos, #enrolled, degs by field	—	—
CPS Curr Pop Sur	—	—	Whether in voc ed, broad demos	—	—
NELS-88	Eng, Social Studies, Sci, Math teachers of sample: Demos, hist, curriculum	School, stud, tchr chars, school policies, programs, climate	8th: demos, family, plans, tests 10/12th: plus work, fam, attitudes	10th: facilities for student services 12th: voc ed services, not facilities	—
NPSAS-PSE Aid	—		Current demos, majors, finaid Undercount of < 4-yr studs	—	
BPS Beg Post Sec	—	—	Demos, ed, occ histories, majors, fin aid 1990 92+	—	—
NHES Hshld Ed	—	—	Demos, type of adult ed progr, major, reasons, barriers	—	—
NLTS Special Ed	—	School policies, programs, size, practices, teacher support	Fam bkgrnd, demos, education and work experiences, HS courses, services, tests, placement	Disabled services, not facilities	—
NAVE Corrections	?	Institution programs, funding, services, testwiseness	Juvenile: overall demos,enrollment Adults: overall demos #inmates	Juvenile census facilities and programs available	?

— Data not available in this dataset

? Unknown until field tests and survey development

Table A3

Variables Useable for Identifying SEC. 421 (c)(1) Population Characteristics

Datasets IA	Women	Native Americans	Handicapped	LEP	Eco. Disadvantaged	Adults Needing Training/Retraining
NAEP Survey	DSEX-Derived gender	DRACE Derived Race-ethnicity: Native Americans	Excluded student file (X004201=1, 3) X004807: If student gets career ed in spec ed	Excluded student file (XREASON=2, 3)	SES: Created from mother father ed, reading materials URBAN Urbanicity Urban/suburb/rural	
NAEP Secondary Transcripts	Linked to NAEP Survey starting in 1990 —> SEX-Derived gender	DRVDRACE Derived Race-ethnicity: Native Americans	HCFLAG If handicapped HCTYPE Handicapping condition		URBAN Comm type big city/urban fringe/ medium city/small place	
HS&B-82 Sophs Survey	SEX Gender Women	RACE Race ethnicity Native American	HANDICAP If handi-capped or in program	HOMELANG Home language other than English	SESQ - Composite var in quartiles HSURBAN-Urbanicity Urban/suburban/rural	Based on education, occupations, unemployment by 1990 (8 years past high school)
HS&B-82 Secondary Transcripts	Linked to HS&B-82 Survey ---------->					
HS&B-80 Seniors Survey	SEXCOMP Gender Women	RACE2 Race-ethnicity Native American	HANDICAP In handicap program	HOMELANG Home language other than English	SESQ - Composite var in quartiles HSURBAN-Urbanicity Urban/suburban/rural	Based on education, occupations, unemployment by 1986 (6 years past high school)
HS&B-80 Postsec Transcripts 1980-84	Linked to HS&B-80 Survey ---------->					
NLS-72 Survey	CSEX Gender Women	CRACE Race-ethnicity Native American	SRFQ9 If handicapped SRFQ10 Type of handicap	BQ88 Is English the primary language?	SES Composite in quartiles COMMUNIT Degree of Urbanicity (Small/med/large/ very large)	Based on education, occupations, unemployment by 1986 (14 years past high school)
NLS-72 PSR Transcripts 1972-79	Linked to NLS 72 Survey ---------->				BYSES Composite in quartiles	Linked to NLS 72 survey

-- Data not available in this dataset

Table A3—Continued

Variables Useable for Identifying SEC. 421 (c)(1) Population Characteristics

Datasets 1B	Single Parents	Incarcerated	Gender Equity Programs	Minorities	Displaced Homemakers
NAEP Survey	—		Gender differences in semesters in math, sci; attitudes regarding math and girls and math	Race-ethnicity differences in semesters in math, sci; attitudes regarding math	
NAEP Secondary Transcripts	—	—	Gender differences in percentage taking courses, credits in courses, by programs	Race-ethnicity differences in percentage taking courses credits in courses by programs	—
HS&B-82 Sophs Survey	Marital status Dependents	—	Gender differences in occupations but just this cohort	Race-ethnicity differences in occupations but just this cohort	Marital status history, public assistance, work hist, dependents to 1990+
HS&B-82 Secondary Transcripts	—	—	Gender differences in this cohort: percentage taking courses, credits in courses, by programs	Race-ethnicity differences in this cohort: percentage taking courses, credits in courses, by programs	Linked to HS&B 82 Survey
HS&B-80 Seniors Survey	Marital status Dependents	—	Gender differences in occupations but just this cohort to 1986	Race-ethnicity differences in occupations but just this cohort to 1986	Marital status history, public assistance, work hist, dependents to 1986
HS&B-80 Postsec Transcripts 1980-84	Linked to HS&B-80 Survey	—	Gender differences in this cohort: percentage taking courses, credits in courses, by programs	Race-ethnicity differences in this cohort: percentage taking courses, credits in courses, by programs	Linked to HS&B 80 Survey
NLS-72 Survey	Marital status Dependents	—	Gender differences in occupations, voc ed fields, but just this cohort to 1986.	Race-ethnicity differences in occupations, voc ed fields but just this cohort to 1986	Marital status history, public assistance, work hist, dependents to 1986
NLS-72 PSE Transcripts 1972-79	Linked to NLS-72 Survey	—	Gender differences in this cohort: percentage taking courses, credits in courses, by programs	Race-ethnicity differences in this cohort: percentage taking courses, credits in courses, by programs	Linked to NLS 72 Survey

— Data not availuble in this dataset

Table A3—Continued

Variables Useable for Identifying SEC. 421 (c)(1) Population Characteristics

Datasets 2A	Women	Native Americans	Handicapped	LEP	Eco. Disadvantaged	Adults Needing Training/Retraining
SASS (faculty)	Gender [TSC319]	Race [TSC320] American Indian, Aleut, Eskimo	—	—	—	—
NSOPF (faculty)	Gender [F41]	Race [F44] American Indian, Aleut, Eskimo	—	—	—	—
IPEDS Fall Enrollment	Women	American Indian or Alaskan Native	—	—	—	—
IPEDS Degree Completions	Women	American Indian or Alaskan Native	—	—	—	—
IPEDS Fall Enroll Occ-spec	Women	American Indian or Alaskan Native	—	—	—	—
CPS	Gender [18G1]	Race [18J] Native American	—	—	—	—
NELS-88	Gender [SEX]	Race [RACE] Native American	In past progrm [HANDPAST Current handicap, program: Parent report [BYHANDPR] Teacher report [BYHANDTR	Language in home [BYHMLANG] Is LEP [BYLEP] Is lang minority [BYLM]	SES composite [BYSES] SES by quartiles [BYSESQ] G8URBAN Urbanicity Urban/suburban/rural	— (Cohort too young)
NPSAS	Gender 1987 [SEX] 1990 [GENDER]	Race [RACE] Native American	Disabled 1987: [S82] 1990:[DISABLTY]	—	Family background. Parent's education, occupation See SES in Table A11	—

— Data not available in this dataset

Table A3—Continued

Variables Useable for Identifying SEC. 421 (c)(1) Population Characteristics

Datasets 2B	Single Parents	Incarcerated	Gender Equity Programs	Minorities	Displaced Homemakers
SASS (faculty)	Marital status [TSC323] Children [TSC324] Children ages [TSC325]	—	Gender [TSC319] of vocational teachers	Race [TSC320] of vocational teachers	Partial definition: Marital status [TSC323] Children [TSC324] Children ages [TSC325]
NSOPF (faculty)	—	—	Gender [F41] by rank [F12] by field [F16a] by full/part-time [F4]	Race [F44] by rank [F12] by field [F16a] by full/part-time [F4]	—
IPEDS Fall Enrollment	—	—	Gender percentages by level, not field	Percentage nonwhite by level, not field	—
IPEDS Degree Completions	—	—	Gender percentages by degrees by prog	Percentage nonwhite by degrees by prog	—
IPEDS Fall Enroll Occ-spec	—	—	Gender percentages by prog	Percentage nonwhite by prog	—
CPS	Marital status [Q91A] Has children[Q14B]	—	—	—	Partial definition: Marital status [Q91A] Has children[Q14B]
NELS-88	Marital status Has children (later surveys)	—	Percent gender by level and type of vocational courses [in transcripts in 2nd FU]	Percent race-eth by level and type of vocational courses [in transcripts in 2nd FU]	— (cohort too young)
NPSAS	Marital status [MARITAL] Number of dependents [S79]	—	Gender percentages by major	Percentage minorities by major	Partial definition: Marital status [MARITAL] Number of dependents [S79]

— Data not available in this dataset

Table A4

Secondary-Level Vocational Education Variables: Program Participation

Concepts and Indicators	1987 Trans/Surveys Not Linked; 1990 Trans/Surveys Will Be Linked		Transcripts and Surveys Linked		NELS88	SASS (1987–1988)
	1987 NAEP Transcript Study	1986 and 1990 NAEP Surveys	1982 HS&B Soph Transcripts	1980–86 HS&B Soph Surveys	8th grade Base-Year (1988)	
Student Demographics						
Gender	Derived gender [SEX]	Student file derived gender [DSEX]		Gender [SEX]	Composite Gender [SEX]	
Race-Ethnicity	Derived race [DRVDRACE]	Student file derived race [DRACE]		Race ethnicity [RACE]	Composite Race [RACE] Hispanic subgroups [HISP] Asian/Pacific race composite [AP]	
Grade Level	Grade in 1985–1986 [GRADE] Mostly 11th graders, range 7th–12th	1986 grades 3/7/11 1990 grades 4/8/12		1980 sophomores every 2 yrs up to 1986	1988 8th graders every two yrs up to Grade 12 and Beyond	
Handicap Status	Handicapped or not [HCFLAG] Handicapping condition [HCTYPE]	Only in excluded student file		HS&B composite variable [HANDICAP] based on reports of handicap or participation in handicap programs	In past handicap program [HANDPAST] Parent report of current handicap or learning dis program [BYHANDPR] Teacher report [BYHANDTR]	
SES	—	SES Composite: Mother, father educ'n [B003501A, B003601A]; Reading materials in home [B000901A–5A]		HS&B composite variable [SESQ] in quartiles	SES Composite [BYSES] SES by quartiles [BYSESQ]	
High School Grades	Avg of student grades [STDGRAD], wtd by Carnegie units [CRSECARN]	—		From GPA on transcript study or self report if no transcript [HSGRADES]	In 2nd followup (1992)	
Student Graduation Status	Student exit status [EXSTAT] Diploma: cert. enrolled, dropout	—		High school completion [SY12] (graduated, in hs now, no dipl, GED)	In 2nd followup (1992) and later followups Below: Grade 8 school info. Later followups: Grades 10, 12 shool info	
School and Community						
School Type	School type [STYPE] (public, private, Catholic, BIA)	Student file [SCHTYPE] School file [SSCHTYP]		School type [HSTYPE=public] (public, private, Catholic)	School control composite [GRSCTRL] (public/Catholic/priv /priv. religious)	School type [SSC014] on School Questionnaires: general el/sec. focus, spec ed, vo tech, alternative, other For private schools [SSC020 047] (types and affiliations of schools)
School Enrollment	Number of students in 1985 [ENROLL]	Student file [NSTUDA] School file [SNSTUDA]		School total enrollment [SB002A]	School total enrollment composite [BYSENRL] 8th grade enrollment [GRENROL]	Total enrollment Oct 1, 1987 [SSCD11]
Urbanicity	[URBAN] Urban (big city) suburban (urban fringe, medium city) rural (small place)	Student file urbanicity [URBAN] School file percent urban [PCURBAN]		Urbanicity [SCHURBAN] urban, suburban, rural	Urbanicity composite [GRURBAN] urban, suburban, rural	Size and urbanicity of community [SSCD18]

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Table A4—Continued

Secondary-Level Vocational Education Variables: Program Participation

Concepts and Indicators	1987 Trans/Surveys Not Linked. 1990 Trans/Surveys Will Be Linked		Transcripts and Surveys Linked		NELS88	SASS (1987-1988)
	1987 NAEP Transcript Study	1986 and 1990 NAEP Surveys	1982 HS&B Soph Transcripts	1980-86 HS&B Soph Surveys	8th grade Base-Year (1988)	
Taking Courses						
Student Participation	Percent taking vocational courses listed below	Percent taking vocational courses listed below	Percent taking vocational courses listed below	Percent taking vocational courses listed below	Percent taking vocational courses on transcripts below In 2nd followup School Administrator Survey: Percent of 12th graders in vocational programs vs general, academic, special ed, other programs	Number of vocational/tech students (SSC055), total enrollment (SSC011)
Course Detail	Detailed courses (CRSECSSC)		Secondary school taxonomy Taking voc courses (if CTHA-C>0)	Took a course in various voc prep areas (FY6A-FY6Q)	In 2nd followup transcripts (1992)	
Program Type	Use secondary school taxonomy to group CRSECSSC. Academic, vocational, personal	Grade 12 in 1990: number semi-task based subjects, including voc ed (BIO7108A)	Secondary school taxonomy: Vocational courses (CTHA, CTHB, CTHC)	In 1 of 7 vocational programs (FY9) Amt of coursework in grades 10-12 in: Business, sales (FY4I), Trade, industry (FY4J), tech (FY4K), Other voc courses (FY4L)	In 2nd followup transcripts (1992)	
Voc Program Categories	Use secondary school taxonomy to group CRSECSSC: Consumer, general, specific SLMP Detailed programs in 8 SLMP		Secondary school taxonomy: Consumer (CTHA) General (CTHB) Specific labor market prep (CTHC) Ten SLMP programs: (CTHC1, 2, 3, 4, 5, 61, 62, 63, 64, 7) First courses (CTHC(1-7)A) Second courses: (CTHC(1-7)B) Specialty courses: (CTHC(1-7)C)		In 2nd followup transcripts (1992)	
Carnegie Units Earned						
Course Detail	Detailed courses (CRSECSSC) Carnegie units of course (CRSBCARN)		Secondary school taxonomy: If taking voc courses, average credits: If (CTHA-C>0), average of (CTHA-C)		In 2nd followup transcripts (1992)	
Program Type	Use secondary school taxonomy to group CRSECSSC, avg CRSECARN Academic, vocational, personal	Grade 12 in 1990: number semi-task based subjects, including voc ed (BIO7108A)	Secondary school taxonomy: Vocational courses: (CTHA, CTHB, CTHC)	In 1 of 7 vocational programs (FY2) Amt of coursework in grades 10-12 in: Business, sales (FY4I), Trade, industry (FY4J), tech (FY4K), Other voc courses (FY4L)	In 2nd followup transcripts (1992)	
Voc Program Categories	Use secondary school taxonomy to group CRSBCSSC, avg CRSBCARN Consumer, general, specific SLMP Detailed programs in 8 SLMP		Secondary school taxonomy: Consumer (CTHA) General (CTHB) Specific labor market prep (CTHC) Ten SLMP programs: (CTHC1, 2, 3, 4, 5, 61, 62, 63, 64, 7) First courses (CTHC(1-7)A) Second courses: (CTHC(1-7)B) Specialty courses (CTHC(1-7)C)		In 2nd followup transcripts (1992)	

— indicates data not available in this dataset

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Table A5

Secondary-Level Vocational Education Variables: Student Outcomes (Linked to Vocational Education Enrollment or Course Taking)

Concepts and Indicators	1987 Trans/Surveys Not Linked, 1990 Trans/Surveys Will Be Linked		Transcripts and Surveys Linked		NELS88	SASS (1987-1988)
	1987 NAEP Transcript Study	1986 and 1990 NAEP Surveys	1982 HS&B Soph Transcripts	1980-86 HS&B Soph Surveys	8th grade Base-Year (1988)	
PSE Attendance						
HS Graduation Status	Student exit status (EXSTAT) Diploma, cert, enrolled, dropout	—		High school graduates (NLSNLEFT in Transcript file), (SY12 in 2ndFU)	In 2nd and later followups	—
Type of PSE Institution	—	—		PSE institutions attended by 1984, 1986 *Self-report: if enrolled in any PSE betwn 1982 and 1984 or 1986, and what type(s): pub/priv & lt 2yr, 2yr, or 4yr	In 3rd and later followups	—
Labor Market Participation	—	—		Six months after hs graduation: *Self-report: Enrolled in PSE at that time	In 2nd and later followups	—
Level of Employment (Part-Time, Full-Time)	—	—		*Self-report: Employment at that time *Status: unemployed PT (<35 hours), FT(35 hours or more), not in labor force	In 2nd and later followups	—
Hourly Wages				Six months after hs graduation: *Self-report: Enrolled in PSE at that time *Self-report: Employment at that time		
By Level of Employment	—	—		Average hourly salary by FT, PT SOURCE: MPR Employment Spells file and Enrollment Spells file and/or 2nd/3rd survey file	In 2nd and later followups	—

— Indicates data not available in this dataset

*Source: MPR Enrollment and Employment Spells Files and/or Second and Third Follow-up Survey File

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Table A6

Secondary-Level Vocational Education Variables: Special Populations

Concepts and Indicators	1987 Trans/Surveys Not Linked, 1990 Trans/Surveys Will Be Linked		Transcripts and Surveys Linked		NELS88	SASS (1987-1988)
	1987 NAEP Transcript Study	1986 and 1990 NAEP Surveys	1982 HS&B Soph Transcripts	1980-86 HS&B Soph Surveys	8th grade Base-Year (1988)	
Gender						Of total enrollment [SSC011]
Women	Derived gender [SEX]	Student file derived gender [DSEX]		Gender [SEX]	Composite Gender [SEX]	Percentage of male students [SSC015 016]
Race-Ethnicity	Derived race [DRVDRACE]	Student file derived race [DRACE]		Race ethnicity [RACE]	Composite Race [RACE]	Number of students by race ethnicity [DSC149 153, SSC052 056]
Black	Black, non-Hispanic	Black, non-Hispanic				
Hispanic	Hispanic	Hispanic			Hispanic Subgroups [HISP]	
Native American	Native American	Native American				Number of teachers by race ethnicity [DSC154 158, SSC057 061]
Asian American	Asian American/Pacific Islander	Asian American/Pacific Islander			Asian/Pacific race composite [API]	
White	White, non-Hispanic	White, non-Hispanic				
Other	Other	Other				
Handicapped					In past handicap prog [HANDPAST]	
Handicapped	Handicapped or not [HCFLAG]	Only in excluded student file		HS&B composite variable [HANDICAP] based on reports of handicap or participation in handicap programs	Parent Report [BYHANDPR]	Any handicap programs [SSC070]
Handicap Condition	Handicapping condition [HCTYPE]				Teacher Report [BYHANDTR]	Number handicap students [SSC071]
Economically Disadvantaged						
SES		SES Composite: Mother, father educatn [B003501A, B003601A]; Reading materials in home [B008901A-5A]		HS&B composite variable [SESQ] in quartiles	SES composite [BYSES] SES by quartiles [BYSESQ]	
In Special Programs	—	—		In various h s programs in Gr 10 [B00140 1], in Gr 12 [FY11A-I]	2nd FU: id in Talent Search, Upward Bound, or other programs in grds 9-12	Number of students in programs Chapt 1 [DSC 144 6, SSC080 083] Free lunch [DSC147 8, SSC084 087]
Educationally Disadvantaged						
Academic Ability		Math, science, reading scores: [MPRCOMP1-5, SRPCMP1-5, REDVAL1-5]		HS&B assessment scores [TESTQ] in quartiles	Standardized composite of reading and math [BYTXCOMP], in quartiles [BYTXQURT], other detailed tests in reading, math, science, soc studies	
High School Grades	Avg of student grades [STDGRAD], wtd by Carnegie units [CRSECARN]			From GPA on transcript study or self-rep of the transcripts [HSGRADES]	Grades 6-8 [BYGRADS BYGRADSQ] Grades 9-12, in 2nd followup (1992)	
Home Language						
English				English [HOMELANG=4-6]	Language in home [BYHMLANG]	
LEP/Other than English		Excluded student survey [XREASON=2]		Non-English [HOMELANG=1-3]	Is LEP [BYLEP] Is language minority [BYLM]	Number ESL Students [SSC065] Bilingual prog/stud [SSC062 063]
Single Parents	—	—		Marital status [TY41] and history [TY46-TY47CY2]; Children [TY49-TY53B]	In 1st and later followups	
Adults Need Retraining	—	—		Determined from emp'ed history	(cohort too young)	
Displaced Homemakers	—	—		Determined from mar stat, emp hist	(cohort too young)	
Sex Equity	Estimated gender balance in cohort. Percent gender [SEX] of those taking at least one first, second, or specialized courses [CRSEC SSC] in each program	Student attitudes toward gender & math 1986: Gr 3 [S207103G], Gr 7 [S202202B S211X8B], Gr 11 [S212002I] Gr 7&11 [S202903C, S209506G] 1990: Gr 4 [M811104B] Gr 8,12 [M810704B]	Gender balance in voc ed programs, but just this cohort	Gender balance in occupations, but just this cohort	Estimated gender balance in cohort Percent gender [SEX] of those taking various levels & types of vocational courses [in transcripts to 2nd followup 1992]	
Incarcerated						

— indicates data not available in this dataset

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Table A7

Secondary-Level Vocational Education Variables: Vocational Teachers

Concepts and Indicators	1987 Trans/Surveys Not Linked; 1990 Trans/Surveys Will Be Linked		Transcripts and Surveys Linked		NELS88	SASS (1987-1988)
	1987 NAEP Transcript Study	1986 and 1990 NAEP Surveys	1982 HS&B Soph Transcripts	1980-86 HS&B Soph Surveys	8th grade Base-Year (1988)	
		Teachers of students in sample only No vocational teachers			Teachers of students in sample only No vocational teachers	
Demographics		Note: 1990 No teachers selected; Gr 12 1986: Math teachers of Gr 11 students				
Gender	—	Gender [T0B4D01]	—		Gender [BY13 1]	Gender [TSC 019]
Race-Ethnicity	—	Race ethnicity [T0B6101]	—	—	Race ethnicity [BY13 2]	Race ethnicity [TSC 020 & TSC 021] White, non Hispanic Black, non Hispanic Hispanic Asian Native American
Age	—	Age [T0B6201]	—		Age [BY13 3Y] 5 year range of birthyears	Age [BY status TSC 022]
Educational Background						
Highest Degree	—	Highest degree [T0B6B01]	—		Highest degree [BY13 8]	Highest degree Highest of [TSC099, 043, 047, 051, 055, 059, 063, 067, 071]
Major Field of Study	—	Undergrad major in math [T0B7103] Post-graduate study in math [T0B7203]	—	—	BA major each subj [BY13 9A1 – BY13_9I1]; Grad major each subj [BY13_10A1 – BY13_10I1]	Major field code [TSC 030, 034, 038, 052, 056, 060, 064, 068, 072] of most valuable after highest degree
Type of Credential	—	State certification in math [T0B6406]	—	—	Type of certificate [BY13 6] Certif in each subj [BY13 7A–7I]	Type of credential [TSC 031, 035, 039, 053, 057, 061, 065, 069, 073]
Teaching History						
Age Began Teaching Full-Time	—		—	—		Age began/birth yr [TSC 016/TSC 022]
Years of Experience Teaching	—	Years of full time teaching [T0B6301]	—	—	Years of teaching [BY13 4]	Years FT teaching (public and private) [TSCU23+TSCU25]
Current Teaching Status						
Field of Teaching	—	Only math, science, reading teachers of students in NAEP sample	—		Only English, math, science, and social studies teachers of NELS88 sample in 8th, 10th graders; math and science teachers in 12th grade	Primary teaching field [TSC 075, 01] (vocational teachers, all subjects) Secondary teaching field [TSC 077=yes, TSC 078, 01]

— indicates data not available in this dataset

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Table A8

Secondary-Level Vocational Education Variables: Organization of Vocational Education Delivery System

Concepts and Indicators	1987 Trans/Surveys Not Linked; 1990 Trans/Surveys Will Be Linked		Transcripts and Surveys Linked		NELS:88	SASS (1987-1988)
	1987 NAEP Transcript Study	1986 and 1990 NAEP Surveys	1982 HS&B Soph Transcripts	1980-86 HS&B Soph Surveys	8th grade Base-Year (1988)	
Types of Institutions						
School Type	School type [STYPE] (public, private, Catholic, BIA)	Student file [SCHTYPE] School file [SSCHTYP]		School type [HSTYPE] (public, private, Catholic)	School control composite [GRCTRL] (public/Catholic/private/priv religious)	School type [SSCH014] on School Questionnaires (general/voc, tech/voc, alternative, other) for private schools [SSCH020-043] (types and affiliations of schools)
Programs Offered	—	—	—	—	2nd Followup: if any of 8 voc services and programs available at school or district	Voc/tech/alt/ch programs [SSC0731] yes/no
Location of Courses	—	—	—	—	2nd Followup: Voc courses location (main high school, area vocational school, community college)	
Definition of Voc Completer	—	—	—	—	2nd Followup: 3 sets of definitions (obtaining credential, completing a sequence of courses, or number of courses or credits. Minimum and maximum number of courses or credits)	

— Indicates data not available in this dataset

Note: No national data currently available on range and distribution of institutional arrangements for delivery of secondary vocational education

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Table A9

Postsecondary Level Vocational Education Variables: Program Participation

			These transcripts and surveys are linked		These transcripts and surveys are linked	
Concepts and Indicators	**CPS - Oct 1990** **Current Population Survey**	**IPEDS** **Integrated PSE Data System Survey**	**1980 HS&B Senior Cohort** **PSE Transcripts (1984)**	**1980 HS&B Senior Cohort** **Surveys: 1980, 82, 84, 86**	**NLS-72** **PSE Transcript Study (1979)**	**NLS-72** **Surveys: 72,73,74,76,79,86**
Student Demographics **Population**	Civilian, noninstitutionalized [H-TYPERP] Not in high school [M-S3J]	Fall enrollments [Forms 412 413] Enrollments by type of institution [From EP Fall enrollment in occupationally specific programs by prog, race] Enrollments separately for men, women	From Second Followup (1984) Those who attended PSE by 1984	From Third Followup (1986) Those who attended PSE by 1986	From Fourth Followup (1979) Those who attended PSE by 1979	From Fifth Followup (1986) Those who attended PSE by 1986
Gender	Gender [H6A]			Gender [SEX, COMP(2nd H)]		Gender [SEX]
Race-Ethnicity	Race [H8] Origin [H8K]	Enrollments by race ethnicity Black Hispanic Native Am Asian Am White		Race ethnicity [RACE2]		Race ethnicity [RACE1] Race ethnicity in 1986 [RACE1 86]
Age	Age [H8J]	Enrollments by sex and age (Ages <18 18 19 20 21 22 24 25 29, 30 34 35 39 40 49 50 64 65+)		Calculate age from birthdate. [BIRTHMO, BIRTHDA, BIRTHYR]		Calculate age from birthdate [CBIRTHMO, BIRTHDA, BIRTHYR]
Region	Region [REGION]			Region of high school [HSREV]		Region [REGION] West South Northcent and North Central
Educational Attainment	Highest grade attended [H8J]			Education attainment by each survey [EDATTAIN]		Up to 1979 [EDATT1] Up to 1986 [EDATT86]
SES				SES quartiles [SESQ]		SES (composite of father ed mother ed father occ household items) In quartiles [SES] Raw score [SESRAW]
Parent's Education	--	--		Parent's education [PAREDUC]		Father's education [FATED] Mother's education [MOMED]
High School Program	--			High school program [HSPG]		High school program [HSPG]
Secondary Vocational Education Courses Taken	--	--		Took any course in 20 vocational areas [HSU6A Q] Number of yrs of courses in: Business, sales [EHSB4H], Trade & ind[EHSI4], Technical [EHST4I] Other voc [EHSH4K]	--	Total semesters taken in subject area [SREQ4H], agriculture [SREQ4I] Business [SREQ5N], Distrib Ed [SREQ5AA], Healthcare [SREQ5NN] Home Ec [SREQ5AAA], Trade occ [SREQ55NNN]
PSE Plans	--			PSE plans [PSEPLANS]		PSE plans - highest level student plans to attain [HQ29H]
Labor Market Participation	Employed, unemployed, not in labor force (NILF) [A-MJACT] Employment level [A-HRSI] Full-time (35+hrs), Part-time (<35 hrs)			See Table A7		Employed unemployed or school other activities [F33A-F33K] Hours worked per week [F37I]

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Table A9—Continued

Postsecondary Level Vocational Education Variables: Program Participation

Concepts and Indicators	CPS - Oct 1990 Current Population Survey	IPEDS Integrated PSE Data System	These transcripts and surveys are linked 1980 HS&B Senior Cohort PSE Transcripts (1984)	1980 HS&B Senior Cohort Surveys: 1980, 82, 84, 86	These transcripts and surveys are linked NLS-72 PSE Transcript Study (1979)	NLS-72 Surveys: 72,73,74,76,79,86
Type of PSE Attended	Public or private [M-S31] 2 year or 4 year college [M-S34] Other types [M-S45B]. Vocational, trade, tech, or business Employer All other	Survey: Fall enrollments [Items 112-113] Highest degree offered [HLOFFER] Less than 1 year, more than 1 year and Less than 2 years, more than 2 years and less than 4 years, Associate Deg [LEVEL] Less than 2 years 2 years or more, less than 4 years [CONTROL] Public, private non profit, private, for profit [SECTOR] Level & control combined	Institution type(s) attended 1980-84 [INSTYPE] (Proprietary, private tech 2-yr, public tech 2-yr, public 2 yr college, private 4 yr, public 4 yr)	From First through Third Followups Institution type(s) attended 1980-86 Kind of school [FE33B1, FE33B2, FE33B3, FE33B4, FE33B5, SE18A, SE19A, SE20A, TE21A, TE22A] (vocational/trade, 2 yr, 4 yr, other) Control of school [FE33G1, FE33G2 FE33G3, FE33G4, FE33G5, SE18B, SE19B, SE20B, TE21B, TE22B] (Public or private)	Institution type(s) attended 1972-79 [INSTYPE] (Vocational, private non vocational, public acad 2-yr, public academic 4 yr, foreign, other)	From Fourth and Fifth Followups Attended PSE by 1979, 1986 Type of institution [ACT277-279 F119A-F120A] (Voc/tech 2 yr, 4 yr, grad, other) Public/private type: for 1979 from transcript file for 1986 from institution matrix [F119-F120]
PSE Enrollment	Taking vocational courses: Working toward degree [M-S35]. Associate (AA) occupational Other license, diploma, or certificate Taking any business, vocational, technical, secretarial, trade, or correspondence courses [M-S36]	Enrollments by type of institution	Courses attempted for all types of PSE institutions Credits earned in courses in public 2 yr institutions	Institutions attended (see above) Type of degree goal (see below)	Courses attempted for all types of PSE institutions Courses completed, credits earned at public 2 year institutions	Institutions attended (see above) Type of degree goal (see below)
PSE Enrollment Level	Full time or part time [M-S33]	—		From Third Followup (1986) Full time student or not [TE21E, TE22E]		From Fifth Followup (1986) Full time student or not [F119D-F120D]
Taking Courses			Courses attempted at all less-than-4 yrs **Courses completed at pub 2-yr only**	Type of degree goal [TE21H, TE22H] (Cert, degree, voc, 2 yr, 4 yr, etc.)	Courses attempted at less than 4 yrs **Courses completed at pub 2-yr only**	Type of degree goal [F119H-F120H] (Cert, degree, voc, 2 yr, 4 yr, etc.)
Course Detail/Taxonomy	—	—	**Taxonomy for less-than-4-yr insts:** **6 digit course CIP code [CRSECIP]**		**Taxonomy for less-than-4 yr insts:** **6 digit course CIP code [CRSECIP]**	
Program Type	—	Survey: Fall enrollment in occupationally specific programs	Taxonomy for less-than-4 yr insts from course CIP code [CRSLCIP]. Academic vs. vocational	—	Taxonomy for less-than-4 yr insts from course CIP code [CRSLCIP] Academic vs. vocational	Type of program [F119C-F120C] (Vocational, academic, or prof)
Vocational Program Categories	—	—	Taxonomy for less-than-4-yr insts from course CIP code [CRSLCIP] 10 vocational course categories	Field of study [TE21G, TE22G] 6 digit CIP code	Taxonomy for less-than-4 yr insts from course CIP code [CRSLCIP] 10 vocational course categories	Field of study [F119I-F120I] 6 digit CIP code
Credits Earned			Courses completed at pub 2 yr only:		Courses completed at pub 2 yr only	
Course Detail/Taxonomy	—		**Taxonomy for less-than-4-yr insts** **Course CIP code [CRSECIP]** **Course credits possible [CRSECRED]** **Grade received [GRADTYPE] type** **[CRSGRADB] numeric** **[CRSGRADA] letter**	—	**Taxonomy for less-than-4 yr insts** **Course CIP code [CRSLCIP]** **Course credits possible [CRSECRED]** **Grade received [GRADTYPE] type** **[CRSGRADB] numeric** **[CRSGRADA] letter**	
Program Type	—	—	Taxonomy for less-than-4-yr insts from course CIP code [CRSLCIP]. Academic vs. vocational	—	Taxonomy for less-than-4 yr insts from course CIP code [CRSLCIP] Academic vs. vocational	—
Vocational Program Categories	—	—	Taxonomy for less-than-4-yr insts from course CIP code [CRSECIP] 10 vocational course categories	—	Taxonomy for less-than-4 yr insts from course CIP code [CRSLCIP] 10 vocational course categories	—

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Table A10

Postsecondary Level Vocational Education Variables: Student Outcomes

Concepts and Indicators	CPS - Oct 1990 Current Population Survey	IPEDS Integrated PSE Data System	These transcripts and surveys are linked 1980 HS&B Senior Cohort PSE Transcripts (1984)	These transcripts and surveys are linked 1980 HS&B Senior Cohort Surveys: 1980, 82, 84, 86	These transcripts and surveys are linked NLS-72 PSE Transcript Study (1979)	These transcripts and surveys are linked NLS-72 Surveys: 72,73,74,76,79,86
PSE Transfers						
From Voc Ed to Other				By 1986 from public 2 year to other Use: 1) type of PSE institutions attended from 1980 through 1986		By 1986 from public 2 year to other Use: 1) type of PSE institutions attended from 1972 through 1986
Program Completion						
Type of Institution		Survey completions Level of offerings (FORMTYPE) C1: 4 year C2: 2 through less than 4 year C3: less than 2 year		Use: 1) type of PSE institution attended from 1980 through 1986		Use: 1) type of PSE institution attended from 1972 through 1986
Level of Degrees		Part A: degrees below BA/BS Categories: less than 1 year to 2 year through less than 4 year Separately by degrees, by gender and race ethnicity Control: public vs. private (SECTOR) By level of offerings		Completed degrees and certificates by 1986 Level of degree studying for (SE18I, SE19I, SE20I, TE21I, 22I) (certificate, 2 year, 4 year, other) Completed or not (SE18I, SE19I, SE20I, TE21I, 22I) (also first followup variables) Field of study of certificates or degrees above (SE18H, SE19H, SE20H, TE21G, 22G) 6 digit CIP codes		Type of program (F1179 F1200) (Vocational academic, or prof) Level of degree goal (F1190 F1200) (Cert, degree voc., 2 yr, 4 yr etc.) Completed cert/degree (F1191 F1201)
Type of Degrees		Degree type: field of study 6 digit CIP codes				Field of study (F1191 F1201) 6 digit CIP codes
Labor Market Participation						
Type of Employment				Employment in 1982, 1984, 1986 Employed, unemployed, not in labor force (FE3A-3J, SE3A-3K, TE3A-3K) Employed full time or part time (TE24A9 E9, SL47I, SE48I, SE49I SE5OI, TE8I, TE9I, TE10I, TE11I)		Employment in 1986 Employed, unemployed in school other activities (F13A F13K) Employed full time or part time Hours worked per week (F167I)
Level of Employment						
Hourly Wages						
By Level of Employment				Hourly wages, shown by FT PT emp (TE24A7R TE24E9, SE47 50 IIA I, TE8 11 IIA I)		Hourly wages (F178A F178H)

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Table A11

Postsecondary Level Vocational Education Variables: Special Populations

Concepts and Indicators	CPS - Oct 1990 Current Population Survey	IPEDS Integrated PSE Data System	These transcripts and surveys are linked 1980 HS&B Senior Cohort PSE Transcripts (1984)	 1980 HS&B Senior Cohort Surveys: 1980, 82, 84, 86	These transcripts and surveys are linked NLS-72 PSE Transcript Study (1979)	 NLS-72 Surveys: 72,73,74,76,79,86
Program Participation	Taking vocational courses	Surveys: enrollments, completions Overall enrollments	Courses attempted and/or completed, and credits earned		Courses attempted and/or completed, and credits earned	
Gender **Women**	See Table A6 Gender [HGI]	Women, men (part of variable name)		Gender [SEXCOMP]	Gender [CSEX]	Gender [CSEX]
Race–Ethnicity **Black** **Hispanic** **Native American** **Asian American** **White**	Race [HJ], Ethnicity [HK]: Black, non Hispanic Hispanic Native American Asian American White, non Hispanic	Race–ethnicity (part of variable name) Black, non Hispanic Hispanic Native American Asian American White, non Hispanic		Race–ethnicity [RACE2] Black Hispanic Native American Asian American White	Race–ethnicity [CRACE] Black Hispanic Native American Asian American White	Race–ethnicity [CRACE] Black Hispanic Native American Asian American White
Handicapped **Handicapped** **Handicap Condition**	– –	– –		Handicapped, in handicap program [HANDICAP]		Handicapped or not [SRI Q9] Type of handicap [SRI Q10]
Economically Disadvantaged **SES**	–	–		HS&B Composite, in quartiles [SESQ]	Base year SES composite [BYSES]	SES in quartiles [SES]
Educationally Disadvantaged **Academic Ability**	–	–		HS&B Assessment scores, in quartiles [TESTQ]	Base year test score categories high, low, middle [BYTEST]	Base year test score categories high, low, middle [APTITUDE] Grades in high school [BQ5]
High School Grades	–	–		HS&B Composite [HSGRADES]		
Home Language **LEP**	–	–		Other than English [HOMELANG]		Is English the primary language in student's home? [BQ88]
Single Parents	Marital Status [Q91A] Has natural/adopted child [Q14B]	–		Marital status [F53, S837, TE41] Children [F862, F862A, S866, S866A, TE49]		Marital status [FQ7A, TQ129, FT165, F1177] Children [FQ8A,B; TQ130, FT177, F184A,B]
Adults Needing Retraining	–	–		Determine from employ/educ history		Determine from employ/educ history
Displaced Homemakers	Marital Status [Q91A] (partial definition)	–		Determine from marital stat, emp hist		Determine from marital stat, emp hist
Sex Equity	–	–	Gender balance in voc ed programs among this cohort	Gender balance in voc ed programs among this cohort	Gender balance in voc ed programs in this cohort only	Occupations, ed of this cohort only
Incarcerated	–	–	–			

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Table A12

Postsecondary Level Vocational Education Variables: Vocational Teachers

Concepts and Indicators	CPS - Oct 1990 Current Population Survey	IPEDS Integrated PSE Data System	These transcripts and surveys are linked 1980 HS&B Senior Cohort PSE Transcripts (1984)	 1980 HS&B Senior Cohort Surveys: 1980, 82, 84, 86	NSOPF (1987-88) Nat'l Survey of PSE Faculty
Types of Institutions					Public 2 year [STRATUM 8] Employment sector [F29C1]
Demographics	—	—	—	—	
Gender					Gender [F41]
Race-Ethnicity					Race ethnicity [F43, 144]
Age					Age [F12]
Educational Background	—	—	—	—	
Highest Degree					Highest degree [F26A1-A7]
Major Field of Study					Major field of study [F26C1-C7]
Current Teaching Status	—	—	—	—	
Field of Teaching					Teaching field [F16A] Detailed 11 vocational programs Voc/nonvoc/all
Teaching Time					Full time, part time [F4]
Tenure Status					Tenure, ten track, non ten [F17]
Academic Rank					Professor to other [F12]
Salary					Current salary [F40A]
Teaching History	—	—	—	—	
Age Began Teaching PSE					Age began teaching PSE: 1) Teaching jobs [F29D1-15=1,7,8] 2) PSE jobs [F29C1-15=1,5] 3) Year of job starts [F29A1-15] 4) Year of birth [F12]
Years Exp Teaching PSE					Years' experience teaching PSE: 1) Job start dates [F29A1-15] 2) Job end dates [F29B1-15]

Table A13

Postsecondary Level Vocational Education Variables: Organization of Vocational Education Delivery System

			These transcripts and surveys are linked		
Concepts and Indicators	CPS - Oct 1990 Current Population Survey	IPEDS Integrated PSE Data System	1980 HS&B Senior Cohort Postsecondary Transcripts	1980 HS&B Senior Cohort Surveys: 1980, 82, 84, 86	NSOPF Nat'l Survey of PSE Faculty
Types of PSE Institutions	--	Survey institutional characteristics PSI: institutions offering vocational education [PEOHSTR] and: 4 year, public & private [PUBLIC1-PUBLIC9, PRIVATE2] and [LEVEL5-LEVEL11] Public 2-year: [PUBLIC1-PUBLIC9] and [LEVEL3-LEVEL4] Public vocational-technical [PUBLIC1-PUBLIC9] and [LEVEL1-LEVEL2] Private proprietary [PRIVATE1] and [LEVEL1-LEVEL4] Private less-than-4 year [PRIVATE2] and [LEVEL1-LEVEL4] NOTE: Variables above = 1 or blank Include in above groups if=1 By state [STABBR]			
Programs Offered	--	6-digit CIP code of 3 largest programs [CIPCODE1, CIPCODE2, CIPCODE3]			
Degrees Awarded	--	See Table A7 Student Outcomes: Program Completion			

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Table A14

NPSAS Postsecondary Level Vocational Education Variables: Program Participation

Concepts and Indicators	NPSAS 1987	NPSAS 1990
Student Demographics		
Population	Students in all types of PSE institutions in undergrad, graduate, first prof progs Sampled October 1986 only	Students in all types of PSE institutions in undergrad, graduate, first prof progs Sampled throughout year 1989-90
Gender	Gender [SEX]	Gender [GENDER]
Race-Ethnicity	Race ethnicity [RACE] (Native Am, Asian, Black not Hispanic, Hispanic, White not Hispanic)	Race ethnicity [RACE] (Native Am, Asian, Black not Hispanic, Hispanic, White not Hispanic)
Age	Age [AGE]	Age [AGE]
Region (By State)	Student's local residence state [RELOCAST] Student's legal resident state [RPERMST]	Student's local state [from IPEDS Institution ID] Student's legal resident state [HOMSTATE]
Educational Attainment	Current academic level [R21a] (Undergrad 1st year, undergrad other, post bac 1st prof, masters, doct, other) Undergraduate year [S36]	Current academic level [Q29] (Undergrad 1st year, undergrad other, post bac 1st prof, masters, doct, other) Undergraduate year [UGRDLVL1]
Dependency status	Dependent or independent financially from parents [R25]	Dependent or independent financially from parents [DEPEND]
SES	Family background For dependent and independent students separately. Use: Dependent student's income [DEPINC], Parent's education [S99_1, S99_2] SEI scores of parent's occupations [S97CDE,S98CDE]	Family background For dependent and independent students separately. Use: Dependent student's income [DEPINC], Parent's education [FATHEDUC MOTHEDUC], SEI scores of parent's occs[SOCDAD90, SOCMOM90]
Parent's Education	Parent's highest education [High of S99_1, S99_2]	Parent's highest education [PAREDUC]
High School Degree Type	High school diploma type [HISCHDEG]	High school diploma type [HSDEG]
Highest Education Expected	Highest education expected [S45]	Highest education expected [EXEDCOL]
Labor Market Participation	Working for pay or not [S1a and S46]	Working for pay or not [LMSTAT]

Table A14-continued

NPSAS Postsecondary Level Vocational Education Variables: Program Participation

Concepts and Indicators	NPSAS	
	1987	1990
Type of PSE Attended	Level and control [VTYPE] (Private not for profit 4 yr, Public 4 yr, Private not for profit less than 4-year, Public 2- to 3 year, Public vo tech, Proprietary)	Level and control [DECON1] (Private not-for profit 4 yr, Public 4 yr, Private not for profit less than 4-year, Public 2- to 3 year, Public vo tech, Proprietary)
PSE Enrollment	Working toward degree/Acert [S4] (Cert/award, Diploma, Associate's, Bachelor's, Post-Bacc, Master's, Doct, First-Professional, Undecided, Other	Working toward degree/Acert [PROGTYP] (Cert/award, Diploma, Associate's, Bachelor's, Post Bacc, Master's, Doct, First-Professional, Undecided, Other
PSE Enrollment Level	Full time or part time [ATTNSTAT]	Full time or part time [ATTEND]
Major Program Field		
Program Type	Major or field of study [MAJCAT] (2-digit CIP code) [S37CDE] (6-digit CIP code) Clock hr students [R20A1CDE] (6 dig) Credit students [R21FCDE] (6 digit)	Major or field of study [MAJORS] (2 digit CIP code)
Vocational Program Categories	Agriculture, business and office, marketing and distribution, health, home economics, technical education, trades and industry, undefined vocational	Agriculture, business and office, marketing and distribution, health, home economics, technical education, trades and industry, undefined vocational

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Table A15

NPSAS Postsecondary Level Vocational Education Variables: Special Populations

Concepts and Indicators	NPSAS 1987	NPSAS 1990
Program Participation		
Gender	Gender [SEX]	Gender [GENDER]
Women	[SEX=2]	[GENDER=2]
Race–Ethnicity	Race ethnicity [RACE]	Race ethnicity [RACE]
Native American	[RACE=1]	[RACE=1]
Asian American	[RACE=2]	[RACE=2]
Black	[RACE=3]	[RACE=3]
Hispanic	[RACE=4]	[RACE=4]
White	[RACE=5]	[RACE=5]
Handicapped		
Handicapped	Disabled or not [S82]	Disabled or not [DISABLTY]
Handicap Condition	Type of disability [S82] (Physical, learning, multiple, none)	Type of disability [DEAFNESS, SPEECH, ORTHO, VISUAL, HEALTOTH, LEARNDIS]
Economically Disadvantaged		
SES	Family background For dependent and independent students separately. Use: Dependent student's income [DEPINC], Parent's education [S99_1, S99_2]. SEI scores of parent's occupations [S97CODE S98CODE]	Family background For dependent and independent students separately. Use: Dependent student's income [DEPINC], Parent's education [FATHEDUC MOTHEDUC], SEI scores of parent's occ[SOCDAD90, SOCMOM90]
Educationally Disadvantaged		
PSE GPA	PSE grade point average [VSTDR21D] (for credit hour students only)	PSE grade point average [GPA]
Single Parents	Marital status [MARITAL] Number of dependents [S79]	Marital status [MARITAL, NUMDEP] Number of dependents [NUMDEP]
Adults Needing Retraining	—	—
Displaced Homemakers	Partial definition: Marital status [MARITAL] Number of dependents [S79]	Partial definition: Marital status [MARITAL] Number of dependents [NUMDEP]
Sex Equity	Percent gender[SEX] of major [MAJCAT] by student academic level [R21a, S36]	Percent gender[GENDER] of major [MJRCODE] by student academic level [UGRDLVL1]
Incarcerated	—	—

APPENDIX B

SUMMARY OF STATE MIS PRACTICES

SECONDARY

Issues	California	Colorado	Idaho
1. Status of data automation	Secondary-level data relevant to vocational education are collected by several different agencies within the California State Department of Education. Generally, these data are submitted to the state on handwritten standard paper forms or on bubble forms for electronic scanning, although some counties/districts submit their data on floppy disk or magnetic tape. The receiving agency inputs the data into its database. Most of the data are submitted in aggregate form for individual schools, districts, or counties, but can be linked across databases using unique school-district-county codes. The only student record information collected at the state level is for students with disabilities.	Colorado has an automated, integrated, student record data system that includes both secondary and postsecondary information. Districts submit student records to the state on a diskette or tape using a software program developed by the state. Several years back, the Colorado Community College and Occupational Education System (CCCOES) provided a personal computer for every district in the state; currently, every district but one has a working computer. Thus teachers or schools enter the data onto the computerized data collection form.	Idaho does not maintain student record systems at the state level. Local secondary agencies report data to the State Division of Vocational Education on paper forms. These are then entered into the state's data system, which maintains aggregate data on each agency. At the local level, the extent of automation varies among secondary agencies. Types of systems differ among schools districts, and even among schools within districts.
2. Levels of vocational coursetaking	California makes a distinction between advanced and introductory occupational programs, which are administered by different agencies within the Department of Education. Advanced occupational programs are administered by the Career-Vocational Education Division (CVE) and are offered through Regional Occupational Centers/Programs (ROC/Ps). ROCs are the equivalent of area vocational schools, while ROPs offer advanced occupational courses in regular high schools. ROC/Ps serve both high school students and adults in the same classroom, although the distinction is drawn between ROC/Ps serving adults and adult education vocational programs. The latter may be offered by ROC/Ps, counties, school districts, or community colleges. All introductory occupational courses, including consumer and homemaking education, industrial and technology education, and some business courses, are considered part of California secondary education and are offered as part of the regular high school curriculum.	In Colorado, vocational enrollment is counted by the number of students in an occupationally specific vocational course. Pre-vocational courses, such as career exploration, are not included as being occupationally specific.	Idaho distinguishes between "specific labor market" and "general labor market" programs. Specific labor market programs are those approved by the State Division of Vocational Education for vocational reimbursement (i.e., state categorical funding). The category includes consumer home economics and teen parenting classes because these are eligible for state funding. Enrollment in these programs can be isolated if a more accurate estimate of "specific labor market" were needed. General labor market classes are those providing general labor market skills. These include exploratory classes and general skills classes such as Typing I, Introduction to Business Computers, and General Welding. These classes are not currently eligible for vocational formula reimbursement due to lack of state funds.

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Issues	California	Colorado	Idaho
3. Ability to provide duplicated and unduplicated counts **a. of all students**	The CVE collects annual enrollment data from each ROC/P. Total enrollment is reported for each course, and is broken down for high school and adult students. Although students taking more than one ROC/P course would be double-counted by CVE in a total enrollment count for the state, ROC/P administrators believe it is rare for high school students to enroll in more than one of their courses in a given year. In addition to CVE enrollment counts, the California Basic Educational Data System (CBEDS) collects annual enrollment data for secondary education from each county and school district. Since counties are the responsible fiscal agents in California, they pass funds for secondary education through to the school districts. Some counties also administer educational programs, such as adult education and ROPs. CBEDS requires that each county and school district in the state reports enrollment at the school level in the vocational education programs it offers. Counties are directed not to duplicate counts for students concurrently enrolled in a school district, and counties and school districts are not supposed to include ROC/Ps in their enrollment counts. (However, it is uncertain to what extent counties and school districts independently offer advanced occupational courses that are not part of ROC/Ps.) Only the total number of students enrolled in county/district vocational education is reported on CBEDS forms; no specific program or course enrollment information is given. Course enrollment data is also available from the CBEDS faculty assignment forms; however, these data produce duplicated counts of students enrolled in vocational education if aggregated across courses.	Colorado has a student record data system at the state level, thus has the flexibility to aggregate and re-aggregate the data to provide unduplicated enrollment counts of students both within programs and among programs. Programs are defined at the six-digit CIP level, and students are assigned to programs based on their course enrollment. However, in cases where the student is enrolled in more than one program area, the state uses an algorithm that assigns the student to one program only.	Idaho can provide unduplicated counts of enrollment in programs by *two-digit* CIP code only. Locals are told to count a student only once. Students are counted first in specific labor market programs. While there are no instructions to locals about how to handle a student enrolled in more than one two-digit specific labor market program, presumably this occurs infrequently. Students are then counted in general labor market programs only if they are not enrolled in specific labor market programs. Idaho also collects duplicated enrollment counts by six-digit code. It does so by asking instructors to report enrollment in each class assignment by class code. The instructor reports actual enrollment for the first semester and estimates enrollment for the second semester (or in some cases the second and third semester for places using a trimester). These class enrollments are reported by total only; there is no attempt to distinguish by race, sex, or special need.

SECONDARY

KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Kentucky has an automated student record system at the state level. Movement toward automation is occurring within the Kentucky Tech system (encompassing the state-run secondary area vocational centers and the postsecondary vocational-technical schools). Four of the Kentucky Tech sites have been computerized as part of a pilot program. At these pilot sites, student data are entered into the on-line system at the local school. Student data for secondary school students are passed to districts on paper forms for districts to input.	The Michigan Department of Education has developed an electronic data system for collection of secondary vocational data at each individual school district. The department expects this system, the VEDS Micro-TURBO system, to be fully implemented at all districts by June 1993. Currently, this system reports data for roughly 85 percent of all vocational enrollments. Once fully operational, the system will facilitate direct downloading to the state from each individual district. In the past, data have been passed along to the Career Education Planning District (CEPD) for editing and aggregation, then given to the state. The new system includes (1) a statewide student-level record system, (2) vocational program files based upon course sections and CIP program classifications, and (3) a student-section linkage code to facilitate analysis of students in sections.	Rhode Island has been able to operate on a system of paper documents because of its small size. However, it is planning to implement a computerized system in all the area vocational schools in the coming year or two. The current mode of information collecting is facilitated by the vocational counselors within each of the area schools. They are charged with meeting with students, filling out information, and maintaining and updating student vocational records. After information is collected, the student data sheets are passed along to the state MIS department for data entry. The system remains at the student record level even at the state.	A recent study by the National Governors' Association found that a majority of states (twenty-six of thirty-two secondary agencies responding to the survey) have a centralized vocational MIS system, generally indicating that a single automated entity receives hard copy or electronically transmitted data from local education agencies (Amico, 1993).
Kentucky counts students enrolled in both gainful and non-gainful programs. The state provides broad guidelines for which programs should be counted in which category. For example, agriculture production should be reported on the gainful roster, while agriscience exploration should be reported on the non-gainful roster; all technical programs are supposed to be reported on the gainful roster. However, for business, the gainful/non-gainful assignment is supposed to be made according to student objectives rather than specific classes.	Michigan makes a distinction in its student vocational enrollments between wage earning and non-wage earning. Basically, wage earning describes all vocational programs other than consumer and home economics programs. Counting of student enrollments at each of these two separate levels is done differently.	Virtually all vocational students take their courses at the area vocational schools, which are located within each school district (except for one school that is independent). Because Rhode Island has a very strict definition of vocational programs, and because the state prefers all vocational programs to be offered at the area vocational schools, the regular academic schools usually do not apply for vocational status and funding. All approved vocational programs must lead towards employment, meet certain curriculum standards, and be taught by a certified vocational instructor. While the academic schools might offer courses generally considered to be vocational, the data collected for these courses are not considered to be vocational data. Thus, the only data for "gainful" programs that are collected by Rhode Island are for those programs offered at the area schools. A small portion of total vocational students enrolled at the area centers are adults, who take courses in the evening (sometmes during the day). Data regarding adults are collected through a separate system.	

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KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Information on gainful courses and students is available in individual student record form. Thus, at the state level, whether at the Department of Education, the Board of Higher Education, or at Kentucky Tech, student enrollment data can be unduplicated by program and across programs. Aggregate data are collected by program on non-gainful courses and students. Thus, unduplicated counts are available only for enrollment within programs, not across programs.	Michigan is able to provide total unduplicated counts of students enrolled within wage earning and non-wage earning programs, but where students are enrolled in both types of programs, there is duplication. Within wage earning, students are counted in only one program per year, even if they are enrolled in multiple programs. The criteria for determining which program will be reported are as follows: either (1) the most recent vocational course enrolled in; or (2) if enrolled at the same time, the course with more contact hours. If all is equal, the student should be assigned to a program by a school administrator. Also within wage earning, distinctions are made between ninth and tenth grade enrollments, and eleventh and twelfth grade enrollments. Within non-wage earning, all students are counted in the same category and assigned to the same program. Home Economics 20.0101.	Rhode Island is able to provide unduplicated counts of all secondary vocational students enrolled at its vocational centers by program and CIP codes. Theoretically, its system should provide unduplicated counts on a current basis, because information is continuously updated throughout the year on various forms. Three sets of forms provide similar information for student enrollments in vocational programs by age, race-ethnicity, grade, and special needs, including handicapped, limited English proficient, academically disadvantaged, and economically disadvantaged (only one may be designated as the primary special need). Also, codes are used to determine the school, community, and identification of the student. Program information is included regarding matriculation date, and hours/day and days/week spent in the vocational program. One form is used to assess all new incoming students at the beginning of a program. The second form is used to assess all returning students, and to update their personal information. The last form is used to update status changes of all vocational students, including program completion, transfers out of the program, drop-outs, and movement out of the community. The conglomeration of the data from these three forms provides the universe of all student enrollments in vocational education programs. In practice, it is probable that the updates are not absolutely current because the local school and state MIS director indicated that there was not enough time, resources, or incentive for the schools to keep updating files throughout the year. Adult vocational education data are collected completely separate from the traditional secondary vocational education data. Total aggregate unduplicated student counts and duplicated counts of the various special needs populations served are produced by these collections of adult data.	

Issues	California	Colorado	Idaho
3. **Ability to provide duplicated and unduplicated counts of students** b. **by demographic group and special population status**	ROC/Ps report to CVE the number of males and females, broken down by race-ethnicity, who are enrolled in each course, as well as the total number of disadvantaged (economically or academically), handicapped, and limited English proficient (LEP) students in each course. However, as stated above, these enrollment data produce potentially duplicated counts of students when aggregated across courses. County/district CBEDS forms report the total number of male and female students who are enrolled in vocational education, broken down by race-ethnicity. However, no information is available on special populations in vocational education. Faculty report the number of male and female students enrolled in each of their courses, although these data produce duplicated enrollment counts when aggregated across courses.	Once the special population information has been collected, unduplicated counts of special population enrollment within programs and among programs can be extracted from the student record database. The difficulty encountered is not in the use and quality of the data, but in the identification of special population students. The available data are fine, but the problem lies in the information that was not collected. Special population status is service driven: if students seek services directed at special populations, then they are labeled as such; if they do not seek special services, then they are not identified as such.	in specific labor market programs, unduplicated enrollment is reported by race-ethnicity by sex. Additionally, there is a count of handicapped students, limited English proficient students, and disadvantaged students. Also there are separate counts of enrollment in grades 9, 10, 11, and 12. For general labor market programs, enrollment is reported separately by sex. Apparently, there are no local counts of single parents or displaced homemakers.
4. **Students included in enrollment counts**	Only those high school students attending an ROC/P course for twenty hours or more in a given year are included in the enrollment counts reported to CVE. The CBEDS count of students enrolled in vocational education in county/district schools and programs includes all students in grades seven through twelve.	All high school students that are enrolled in an occupationally specific vocational course are included in the enrollment count.	Secondary counts include all students in grades 9–12.

SECONDARY

KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Kentucky can aggregate and re-aggregate data on gainful students by their special population status because of the state's ability to sort by individual student record. However, non-gainful program counts of special populations are unduplicated within type and program, but are duplicated between types of special populations and among programs.	Michigan reports unduplicated numbers of wage earning student enrollments (at all grades) and completions (eleventh and twelfth graders) by program, by race-ethnicity, and gender. Also, Michigan is able to report unduplicated counts of ninth and tenth, and eleventh and twelfth graders enrolled in the non-wage earning classification by race-ethnicity and by gender. In this same report, Michigan collects total counts of students of the following types: handicapped, limited English proficient (LEP), and adults. However, these are not collected by program type, and duplication can result from one student having multiple special characteristics. In the new VEDS system (implemented within two years), new fields will be included to assess unduplicated counts of academically disadvantaged, handicapped, single parents and displaced homemakers, LEP students, and criminal offenders.	The state is able to provide total unduplicated counts of secondary students by program by some demographic characteristics, but only duplicated counts by other characteristics. Regarding gender, race-ethnicity, and age, the state can provide unduplicated counts by program. However, in regards to the special populations, (academically and economically disadvantaged, handicapped, and limited English proficient), only duplicated counts can be given, because each student may be assigned to multiple special needs. No information is collected in the three forms regarding single parents and displaced homemakers, or correctional facilities. Currently, Rhode Island does not collect such data, but plans to in the future.	
Given the capabilities of an integrated individual student record system at the state level, vocational enrollment counts can be aggregated in many different ways. In counting secondary vocational students, Kentucky currently considers secondary students in postsecondary vocational programs as secondary students, and counts them as such.	Counts of enrollments and completions in vocational programs include counts of atypical students. For example, adults are included in counts of eleventh and twelfth grade enrollments and completions. Also, secondary students that are enrolled in a postsecondary program are counted by the district that receives the reimbursement for the program. And, in cases where students are enrolled in vocational programs within other districts, there are specific instructions to allow for the students to be counted only once—where they are enrolled.	This system is very clear, defined, and straightforward. As a consequence, there is no confusion about who is included in the enrollment counts of secondary vocational programs. Adults are excluded. Only those students enrolled in state recognized programs (those offered at area schools) are included.	

SECONDARY

Issues	California	Colorado	Idaho
5. Timing of enrollment count and data collection	ROC/P enrollment data are tallied at the end of each school year for the entire year. In contrast, CBEDS enrollment data are collected on the state's Information Day, a specified day in October, and only fall enrollment data are collected.	Districts have to report the data to the state in May; however, the exact data collection dates are left to the discretion of the local districts. The general process seems to be that teachers ask students to complete a data collection form on the first day of each term; the teachers then have the responsibility for entering these data into the system by April, so that the districts can submit the tape or diskettes to the state by May.	Unduplicated counts are made after the start of each semester and are reported in February or March.
6. Definition of program completers	CVE defines completers as students who have met ROC/P course objectives, that is, they have acquired the skills deemed necessary for employment, and are no longer enrolled in the course. California secondary education does not define completion for those students participating in vocational education outside of ROC/Ps.	Secondary students who completed a defined sequence of courses in occupationally specific programs approved by the state are considered vocational completers.	At the secondary level, a program completer is defined as follows: (1) for agriculture, business, marketing, and trade and industry programs, a completer is one who has completed 75 percent of the total approved course sequence; (2) for health occupations, a completer is one who has completed two semesters of the health occupations program; (3) for occupational home economics, a completer is one who has completed two semesters of the occupational home economics program; (4) for teen parenting, a completer is one who has participated in the program and who has graduated from high school. In at least one of the secondary districts we visited, local officials said they could not accurately count program completers.
7. Identification of special populations **a. Economically disadvantaged**	CVE defines disadvantaged students as those who have been identified as either economically or academically disadvantaged by application of recognized screening criteria determined by the ROC/P. State guidelines suggest that economically disadvantaged students be identified based on participation in school lunch programs, work-study programs, or family participation in AFDC.	Economically disadvantaged status is determined by eligibility for free or reduced-price lunch.	Definition is derived from the Perkins regulations.

KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Enrollments are reported as of October 1, and are updated at the end of the year.	Unduplicated enrollment and completion counts are taken once annually at the end of the academic year on June 30. Duplicated counts of enrollment are taken four times throughout the year, twice each semester.	The forms for new and returning students must be completed and returned to the state department by October 1. But the state reported that there is a strong tendency for schools to be late in submitting the forms. Reports are turned around and given back to the schools by mid-year. Theoretically, the student status change forms are supposed to be completed within one week of any change in a student's status in a program. However, as noted earlier, this usually does not occur so promptly.	
The formal definition of a completer is a student who successfully completes a specified end "DOT" (i.e., set of competencies) in a gainful program. However, the school district visited mentioned that students who completed two years of the vocational program and graduated from high school were considered completers even if they did not attain the exit DOT.	A program completer is someone who (1) is an eleventh or twelfth grader (or adult), (2) is reported as enrolled in a vocational program (defined as a sequence of courses with a specific vocational goal), and (3) has completed the program according to the criteria of the local district.	Program completion is simply defined as successful completion of program curriculum and attainment of the occupational objective. Students are designated as completers if (1) they fill out a change of program status form indicating successful program completion, or (2) they graduate from high school while enrolled in a vocational school, which would usually signify program completion. The only discrepancy in this system would arise when students fulfill their high school graduation requirements, but do not fulfill their vocational objectives. In such cases, the schools should fill out a change of status form, indicating that the student has dropped out of the vocational program at graduation. However, it is possible that some students are included in these completion counts, even if they did not fulfill their vocational objectives.	A recent study by the National Governors Association found that the definition of program completers differs across states and across local education agencies within a state (Amico, 1993). For example: (1) Alabama defines a "program completer" as a student who finishes a planned sequence of courses, services, or activities designed to meet a vocational objective that teaches entry-level job skills, whether or not the student graduates; (2) Georgia defines a "program completer" as any student who graduates and has taken at least three different courses in a single vocational program area; and (3) the District of Columbia defines a "program completer" as a student who has finished all of the required skills and met all of the levels of competencies in a program resulting in receipt of a vocational program certificate.
Economically disadvantaged students are determined by eligibility for free and reduced-price lunch.		Economic disadvantages are defined by the state in two different ways. 1. The state uses one definition for allocating Perkins funds to the local education agencies (LEAs). This formula, which would not be divulged to us by the Title I office, uses the decennial census data and adjusts it annually to reflect the number of AFDC recipients, the neglected and delinquent counts, and the foster child counts by county. *(continued on page 11)*	

Issues	California	Colorado	Idaho
(7a—continued)			
b. Academically disadvantaged	As stated above. CVE defines disadvantaged students as those who have been identified as either economically or academically disadvantaged by application of recognized screening criteria determined by the ROC/P. State guidelines suggest that academically disadvantaged students be identified based on enrollment in remedial programs, student performance below grade level, poor performance on standardized tests, or student failure of a grade.	Academically disadvantaged students are defined as those who rank at the bottom 25 percent of their class.	Definition is derived from the Perkins regulations.
c. Limited English proficient	CVE defines LEP students as those belonging to a national origin minority group that does not speak or understand the English language. This lack of understanding affects course participation.	LEP students are identified as such if they are in a program for LEP students. CCCOES officially defines LEP students as those who do "not speak and understand the English language in an instructional setting well enough to benefit from the instruction and cannot complete the objectives of the program without special assistance."	Definition is derived from the Perkins regulations.
d. Handicapped/ disabled	CVE defines handicapped students as those with health impairments or learning disabilities requiring special assistance or materials for course participation. The state requires that students be certified as handicapped under the guidelines for special education.	Handicapped/disabled students are broken down into eleven categories and identified as such if they receive special education services for their specific needs.	Definition is derived from the Perkins regulations.

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KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
		2. In filling out their vocational student forms, the schools are supposed to count students as economically disadvantaged if they (1) have a family income below the poverty line, (2) are eligible for a free lunch, (3) are eligible for AFDC, (4) receive Pell or a comparable grant, or (5) are eligible for funds under Title II of the Job Training Partnership Act (JTPA).	
Academically disadvantaged status used to be determined by California Test of Basic Skills (CTBC) scores in reading and math; however, starting last year, academically disadvantaged status is being determined through student portfolios and performance testing.	Any one or more of the following criteria determine academically disadvantaged status: GPA below 1.5 on a 4.0 scale for all courses the previous year; score below the 25th percentile on an aptitude test; enrollment in an alternative education program the previous year; or dropout or identified as a potential dropout.	Any student who scored below the fiftieth percentile on a standardized aptitude test, whose secondary GPA is below a 2.0 on a 4.0 scale, or who has failed to achieve basic academic competencies, is considered academically disadvantaged.	
LEP students are determined by self-identification or upon the receipt of LEP services.	Vocational education students who may experience difficulty performing class activities and assignments in the English language because their native tongue is a language other than English are designated as LEP students.	Students are considered LEP if (1) English is not their first language, (2) they came from an environment where English was not dominant, or (3) they scored below the allowable cutoff for standardized tests of English proficiency.	
Handicapped/disabled status is determined by self-identification, referrals from outside agencies, and/or upon the request for special handicapped/disabled services. The Fayette County School District works off a Department of Student Services list of students that have been tested and screened during elementary school, and assessed as having some level of exceptionality.	To be served as handicapped, a student must be enrolled in a special education program leading to a high school diploma, and must have an individualized educational plan prescribed by an IEPC.	Students with a variety of conditions that will limit their success in regular vocational programs are defined as handicapped/disabled. Students can have multiple disabilities.	

Issues	California	Colorado	Idaho
e. **Single parents and displaced homemakers**	Neither CVE nor California secondary education defines the term.	Students who receive services for single parents and displaced homemakers (for example, pregnant teens or teen mothers) are identified through service delivery. Several state agencies (Department of Social Services, Department of Health, CCCOES, Department of Labor, and the Job Training Partnership Act (JTPA)) share the same intake form for teen parents and single parent and displaced homemaker programs; thus the data for services provided by these state agencies are uniform throughout all programs.	
8. **Followup procedures**	ROC/Ps survey their program completers during the January following the end of the relevant academic year. Some ROC/Ps also survey their program leavers, that is, those students who terminated enrollment without meeting course objectives or achieving employability. Follow-up status counts are reported for each ROC/P course. Although information is collected for both high school and adult students, follow-up status is not reported separately for these groups.	Up until the 1991–92 school year, follow-up data were collected on all secondary program completers and noncompleters of occupationally specific courses. Starting in 1991–92, only graduates will be followed up. Graduates are followed up between six to eight months after program completion (between November and February of the year following graduation). Mainly teachers call graduates to gain follow-up information.	At the secondary level, follow-up is done by the lead instructor in the vocational programs of agriculture, business, health, marketing, occupational home economics, teen parenting, and trade and industry. Follow-up reflects student status as of December/January of the year following graduation from high school. Follow-up is limited to program completers. Instructors report the status of students in the following categories: military, employed (related or not related to training), pursuing additional education (vocational or academic), seeking employment, not in the labor force, unknown, and deceased. Instructors are free to do follow-up in whatever manner they choose. Most use the mail first and then follow-up by telephone. Response rates appear to be rather good—70 percent or better. There are no systematic surveys of employers.

KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
		Rhode Island does not collect data regarding single parents and displaced homemakers, or correctional facilities. Rhode Island expects to collect this information in the future.	
Completers are followed up six months after they graduate. Local school districts are given the latitude to follow up in any manner they choose. The school district visited has teachers conduct a telephone follow-up of gainful graduates in January. Kentucky Tech's area vocational schools have a uniform six-month follow-up survey that instructors administer.	Follow-ups are conducted by the local school district within a period not greater than nine months following graduation (between February and April). Surveys can be conducted by mail or phone, and in the future the VEDS system can be used to facilitate automatic phone connections. The state provides a sample follow-up format, but the districts may use their own format, as long as they include the necessary state fields. On average, a response rate of 76 percent is attained. Follow-ups are conducted each year for the following types of program completers only: (1) those twelfth grade and adult students completing a program in the preceding year; and (2) those eleventh grade students completing a program two years prior. Employer follow-ups are not conducted. Additionally, the state offers to analyze the data of any district that wishes to do follow-up on non-vocational student completers.	Follow-up is conducted for seniors six months after they graduate from a vocational program. No follow-ups are conducted for students who completed their vocational program before graduation. Each individual school is responsible for conducting the follow-up. Although schools generally use the mail approach, it is recognized as ineffective, and response rates are only about twenty-four percent. Response forms are sent to students by the schools with a return envelope addressed to the state, where data is entered and analyzed. Optional questions are included to assess the former students' employers, and their attitudes about the students training.	A recent study by the National Governors Association found that in most states (eighteen of thirty secondary agencies responding to the survey) program followup is decentralized, being conducted by local education agencies (Amico, 1993).

Issues	California	Colorado	Idaho
9. **Faculty information**	CVE annually collects information on the number of certified and classified staff in each ROC/P, including administrators, teachers, pupil services personnel, paraprofessionals, office and clerical staff, and other classified staff. Each ROC/P reports the number of full-time (counted as individuals) and part-time (counted as full-time equivalent (FTE)) staff in each category, as well as the number of males and females by their race-ethnicity. ROC/Ps report all staff employed directly or through contracted agreements with participating counties or school districts. In turn, CBEDS requires that counties/districts report the number of classified staff, by classified category, full- and part-time status, gender, and race-ethnicity. Counties/districts also provide information on teacher shortage and demand, based on the number of emergency credentials or waivers allowed, the number of vacant positions, and the expected number of hirees for each subject area. In addition, all certified staff members are required to provide information on their teaching and/or non-teaching assignments (including the number of students in each course), gender and race-ethnicity, highest education level, number of years of professional educational service, tenure status, full- or part-time status, and type of teaching credential. Since certified staff report all their assignments, including any contractual arrangements with ROC/Ps, these CBEDS data overlap with the annual CVE certified staff counts, without any simple means of unduplicating the information.	Teacher data are routinely collected through an automated datasystem. Teachers are identified as vocational or academic on the basis of their credentials.	The state can identify vocational instructors.

KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
The State Department of Education collects data on all professional staff and teachers within the department. This includes vocational teachers in secondary schools and instructors at locally run area vocational centers. Information on Kentucky Tech's faculty, that is, instructors at the state-operated area vocational centers, is not uniformly collected. Data on faculty would have to be obtained directly from the personnel files kept at the state level.	Teacher information is collected and kept with the Teacher Certification Unit, a separate branch of the Department of Education. Districts must report teachers' social security numbers for each vocational course section offered. The teacher information can be accessed through this link between the courses and teacher records. The secondary vocational educational branch can access faculty records regarding certification, training, and other personal data through the use of the social security number.	Since the number of schools in Rhode Island offering vocational programs (area vocational schools) is so few, the data collected on the instructors are kept on file in hard copy at the state department. The system is so small that the state director has direct knowledge of most instructors. The following instructor information is kept on file: programs taught by faculty, instructor certification, work experience in the field, and special qualifications.	

POSTSECONDARY

Issues	California	Colorado	Idaho
1. **Status of data automation**	In the past, vocational education data at the postsecondary level were collected through the California Community College (CCC) system's automated Vocational Student Data System (VSDS). A minority of CCC districts submitted their VSDS data on hard copy. However, because of the use of flat files, and the use of a VSDS-specific student identifier rather than social security number, there was no way to link the vocational data to other data collection efforts. Currently, the state is phasing in an integrated Management Information System (MIS) for all postsecondary education in the CCC system, including vocational and nonvocational education, and relying on social security numbers as student identifiers. However, a few CCC districts still do not gather social security numbers. The MIS will generate all reports to federal agencies, the state legislature, and to local institutions.	Colorado has an automated, integrated, individual student record data system that includes both secondary and postsecondary information.	Idaho does not maintain student record systems at the state level. Local postsecondary agencies report data to the State Division of Vocational Education on paper forms. These are then entered into the state's data system, which maintains aggregate data on each agency. At the local level, all of the campuses appear to have automated student records, although the systems differ among sites. A state-level, automated postsecondary student record system is planned for the 1993–94 academic year but not yet implemented.
2. **Levels of vocational coursetaking**	For a number of years, the CCC system has used a state-developed Student Accountability Model (SAM) for assigning a vocational major to a student. Institutions assign one of the following SAM codes to each vocational course they offer: A, apprenticeship; B, advanced occupational; C, clearly occupational; D, possibly occupational; E, nonoccupational but offered in an occupational department; F, consumer and homemaking education (non-occupational); as well as O, all other; and X, unknown. A student's major is generally determined to be the program area of the highest SAM-coded course in which the student enrolled during the academic year. However, the SAM also details a decision tree for assigning the appropriate major in more complex cases. In the annual performance report to OVAE, CCC provides two figures for vocational program enrollment: first, a tally of all students with SAM codes B or C; and second, a tally of all students with SAM codes D or F. CCC also provides enrollments in apprenticeship (SAM code A). In addition, CCC counts completions for students with SAM codes B or C, and for students in apprenticeship programs.	Colorado counts only the students pursuing a vocational program, that is, those who were enrolled in at least six semester hours of a vocational program during a single semester.	At the postsecondary level, there is no distinction between specific and general labor market programs. All reporting is done by six-digit code (see below).

KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Kentucky has an automated individual student record system at the state level for gainful students. Records are computerized at the community colleges and universities. Movement towards automation is occurring within the Kentucky Tech system (encompassing the state-run secondary area vocational centers and the postsecondary vocational-technical schools). Four of the Kentucky Tech sites have been computerized as part of a pilot program. At these pilot sites, student data is entered into the on-line system at the local school.	Michigan has an automated data system called the CTS (Computer-Based Telecommunications System), which facilitates the passage of student data, including vocational data, from the community colleges to the state. Each school collects and stores the information at the school through a computer driven student-level record system, based upon a school identification number. The information is then passed along to the state through the CTS in aggregate form.	The state of Rhode Island is unique in that it has only one community college, which is extended to multiple campuses. The school has a computerized student-level data collection system that it uses for its own programming purposes. However, the state does not have a computerized postsecondary vocational data system. The state receives only school-level data reports that are submitted on federal IPEDS forms.	A recent study by the National Governors' Association found that a majority of states (nine of fourteen postsecondary agencies responding to the survey) have a centralized vocational MIS system, generally indicating that a single automated entity receives hard copy or electronically transmitted data from local institutions (Amico, 1993).
Kentucky counts students enrolled in both gainful and non-gainful programs. Within the Kentucky Tech system, this distinction is dependent upon the length of the program in which a student is enrolled. Programs of 500 hours or more are considered gainful programs, while programs of less than 500 hours are considered non-gainful programs. The community colleges and four-year universities make the gainful/non-gainful determination using students' majors and the programs in which they are enrolled.	Michigan has established differences among the various types of students enrolled at the postsecondary level based upon their academic orientation. Three types of students exist: (1) students enrolled in credit courses seeking a formal degree/award (that is, a program); (2) students enrolled in credit courses not seeking a formal degree/award; and (3) students enrolled in non-credit courses. Student enrollment data are collected according to these classifications.	The state does not provide a clear definition for postsecondary vocational students. For policy reasons, the school has tried not to classify students into vocational tracks. Therefore, the school can only identify vocational students by a process of eliminating those students not enrolled in a specifically academic or transfer program. The school maintains course and program data that could be used to further identify vocational students, but it cannot do so because it lacks a definition to classify vocational students.	

Issues	California	Colorado	Idaho
3. Ability to provide duplicated and unduplicated counts **a. of all students**	Because of its detailed SAM decision tree and its student record system, the CCC system is able to provide unduplicated counts of students enrolled in, and completing, specific vocational programs. However, CCC uses a state-developed Taxonomy of Programs (TOP) to classify its vocational programs, rather than the NCES-developed Classification of Instructional Programs (CIP). Although the TOP has been cross-walked to the CIP, some discrepancies between the systems exist, at least at the margins. For example, while some TOP programs are considered vocational by the state, their CIP equivalents are not. Furthermore, some courses in CIP vocational program areas are considered by the state (and are coded in TOP) as transfer or nonvocational courses.	Colorado has a student record data system at the state level, thus has the flexibility to aggregate and re-aggregate the data to provide unduplicated enrollment counts of students both within programs and among programs. Programs are defined at the six-digit CIP level, and students are assigned to programs based on their course enrollment. However, in cases where the student is enrolled in more than one program area, the state uses an algorithm that assigns the student to one program only.	Institutions report unduplicated head counts by six-digit CIP code. These counts are reported by race-ethnicity by sex. Additionally, counts of handicapped students, students with limited English proficiency, and disadvantaged students are also provided. Postsecondary institutions also report total student contact hours by six-digit program code.
b. by demographic group and special population status	The old VSDS collected information on the instructional setting of Perkins I special populations. During the transition from VSDS to MIS, CCC implemented an interim collection of the new Perkins II special populations. The fully implemented MIS will be able to produce unduplicated counts of these groups.	Once the special population information has been collected, unduplicated counts of special population enrollment within programs and among programs can be extracted from the student record database. The difficulty encountered is not in the use and quality of the data, but in the identification of special population students. The available data are fine, but the problem lies in the information that was not collected. Special population status is service driven: if students seek services directed at special populations, then they are labeled as such; if they do not seek special services, then they are not identified as such.	

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KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Information on gainful courses and students is available in individual student record form. Thus, at the state level, whether at the Department of Education, the Board of Higher Education, or at Kentucky Tech, student enrollment data can be unduplicated by program and across programs. Aggregate data are collected by program on non-gainful courses and students. Thus, unduplicated counts are available only for enrollment within programs, not across programs.	Michigan bases program enrollment counts upon the intentions that students declare to complete a certain degree/award. Michigan can provide total unduplicated counts of student program enrollments across all programs. Students who are not seeking a formal degree/award are not included in the program enrollment counts. Students can not be duplicated in more than one program, because they can only seek one degree. For data collection purposes, the state department designates each program that the schools offer by a comparable CIP code. Also, for funding purposes, Michigan collects information about teaching contact hours by program. However, these data are aggregated, meaning that it is not possible to get student head counts or to determine the types of students served by demographic characteristics.	The IPEDS surveys include the fall enrollment survey of all students and the biannual survey of enrollments in occupationally specific certificate programs. The Community College of Rhode Island (CCRI) does have student-level course enrollment data, but because the school has not defined vocational courses, it is not able to provide vocational course enrollment counts.	
Kentucky can aggregate and re-aggregate data on gainful students by their special population status because of the state's ability to sort by individual student record. However, non-gainful program counts of special populations are unduplicated within type and program, but are duplicated between types of special populations and among programs.	Michigan collects two types of enrollment data. The first type is fall enrollment data, which are aggregate totals of all students enrolled at the community colleges during count day in the fall semester. These data are collected by part-time and full-time designations; by student classification levels (for example, degree seeking); and by race-ethnicity, gender, age, residence status, handicapped status, and age. No information regarding program enrollments are included in these counts. The second type of enrollment data is year end enrollment, collected by program and by race-ethnicity, gender, age, handicapped, and residence status. Data on other students (single parents and displaced homemakers, limited English proficient (LEP), academically and economically disadvantaged, and corrections) are collected by the state through mandatory final reports, and are audited by the state through on-site evaluation visits. These special reports must be completed by any school receiving federal funds for vocational education.	Student demographic data are collected and can be merged with the student course files using the students' social security numbers. However, CCRI does not usually merge and analyze these data because of limited staff time and resources. From these data, duplicated course enrollments could be broken down by race, gender, handicapped, and academically and economically disadvantaged.	

Issues	California	Colorado	Idaho
4. Students included in enrollment counts	MIS includes all students enrolling in at least one census class or attending at least one positive attendance class, that is, open entry/exit courses, such as basic skills.	To be included in the count of vocational students, a student must be enrolled for at least six semester hours in a single vocational program in the semester being surveyed. Those students with less than six semester hours are counted in the vocational full-time equivalent (FTE), but not as a vocational student. Students can only be enrolled in one program; when students are identified as being enrolled in two programs, they are randomly assigned at the state level to a single program.	Postsecondary counts include full-time and part-time students.
5. Timing of enrollment count and data collection	Enrollment counts are taken during one of two censuses for daily or weekly census classes, and the data are reported to the state at the end of term. However, some local administrators complained that the fourth week census did not count enrollments during the second nine-week term or for some positive attendance classes. Some also complained that summer courses were not counted.	Data collection occurs during the last semester of the academic year for the two previous semesters. Data to the state for Perkins reporting are due before the final student data are complete (the spring semester is still in session). However, the final audit, due to the Colorado Council on Higher Education on July 15, contains the complete enrollment data of the previous academic year. This final enrollment database becomes the master database from which all others are cut and that provides the information for all audits.	The count is made on the tenth instructional day of each 8-week session.
6. Definition of program completers	Under VSDS, CCC identified a program completer as either a student with a SAM code of B or C who received an associate degree or program certificate, or a student with a SAM code of B who completed a B-level course. Under MIS, successful completion was assumed if the student reached a B-level course.	Completers are identified by award of a vocational degree or certificate.	A completer is "a student who finished a planned sequence of courses, services, or activities designed to meet a vocational occupational objective. This person must have met all the requirements of the institution for program completion, whether or not the person graduated from the institution." Officials questioned the accuracy of completer counts.

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KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Enrollment counts generally include all vocational students registered and enrolled in all levels of postsecondary programs, whether certificate or degree programs. However, secondary students taking postsecondary courses at a Kentucky Tech vocational-technical school are not considered postsecondary students in the annual performance report but are considered postsecondary students in IPEDS reporting.	Counts of program enrollment are very difficult to interpret for two reasons. First, administrators are relied upon to determine and update students' program intentions. Undoubtedly, there is much discrepancy between students' declarations and actual program completions. Second, students who go on to four-year universities might be counted for enrollment in a vocational program and receive the training, even though they will be transferring on to continue their education. Because of these inconsistencies, program enrollments are not clearly defined until graduation (completion), when program designation is confirmed.	Clearly, there is a lack of accuracy in reporting vocational enrollments. Because students are designated as vocational by a process of elimination, many non-vocational students may be included in this count and vice versa.	
For the programs under Kentucky Tech, enrollments are reported as of October 1. In the university system, all institutions report enrollments as of five days after the start of the semester.	Count day for fall enrollment collection is either the tenth day of class, or after one-tenth of the fall term has passed. Count day for year end enrollment is at the termination of the academic year (after June 30).	Vocational enrollment counts are collected biannually, as required by the federal IPEDS data collections.	
At Kentucky Tech's vocational-technical schools, a completer is defined as a recipient of a certificate or diploma in a long-term program (a program of 500 or more hours). At the community colleges and universities, vocational students who receive their associate degrees are completers.	Students are considered completers if they have satisfied all the requirements for a one- or two-year occupational education program (and the award is actually conferred).	The general definition of a program completer is a student who receives a certificate or associate degree. However, school officials were concerned with this stringent definition, because only about ten percent of all students graduate with a formal degree.	A recent study by the National Governors' Association found that the definition of program completers differs across states and across local institutions within a state (Amico, 1993). For example: (1) Illinois defines a "program completer" as a student who completes a sequence of courses to acquire academic and occupational competence and receives a certificate or associate degree; (2) Texas defines a "program completer" as a student who completes a Board-approved degree or certificate in technical education; and (3) Washington defines several levels of "program completers," including course completers with varying amounts of credits earned; degree completers; and certificate completers with varying amounts of training.

POSTSECONDARY

Issues	California	Colorado	Idaho
7. Identification of special populations **a. Economically disadvantaged**	The state received a waiver from Perkins requirements to count its economically disadvantaged students based on whether a student *qualifies* for financial aid rather than receives financial aid. Determination is based on Pell grants and the state's Basic Education Opportunity Grants (tuition relief) or other similar financial aid.	Students are considered economically disadvantaged if they have family incomes at or below the poverty line. This information comes from the student financial aid form.	See the definition under secondary education.
b. Academically disadvantaged	The SAM manual suggests identifying academically disadvantaged students based on enrollment in remedial instruction or placement on academic probation. Individual institutions choose which method to use.	Entering students are determined to be academically disadvantaged if they do not perform up to a certain level on the SAT/ACT or on the entry assessment instruments (students who did not take the SAT/ACT are assessed upon entry). Enrolled students are considered academically disadvantaged if they are performing below grade level and have been referred to, or have sought special services.	See the definition under secondary education.
c. Limited English proficient	State-level administrators believed that some institutions defined an LEP student as any student who took an ESL class. However, the administrators were not sure whether all institutions defined this population in the same way.	LEP students are identified as such if they seek LEP services provided by the community colleges. The Colorado Community College and Occupational Education System (CCCOES) officially defines LEP students as those who do "not speak and understand the English language in an instructional setting well enough to benefit from the instruction and cannot complete the objectives of the program without special assistance."	See the definition under secondary education.

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KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Students who receive Pell grants and/or who report that their income falls below federal poverty lines are considered economically disadvantaged. Students are identified through financial and intake forms from the assessment and learning centers. These two forms may not capture the entire universe of economically disadvantaged students.	Economically disadvantaged students are defined as those who are from families receiving financial assistance, or are migrants.	[The primary source of data for identifying special populations is service delivery. For example, if a student receives aid in mainstreaming, or mobility assistance, the student would be classified as handicapped. Additionally, students may self-report their special needs, without receiving a particular service. Many problems arise when identifying academically and economically disadvantaged students. Because many needy students do not ever receive services for their special needs, they are not included in data collection.]	
At Kentucky Tech's vocational-technical schools, Test of Adult Basic Education (TABE) scores are used to determine academically disadvantaged status. The community colleges and universities may identify academically disadvantaged students in different ways. At the community college visited, academically disadvantaged students are those who were recommended for remedial work based on their placement testing.	Students defined as academically disadvantaged include those who are dropouts or potential dropouts from high school, those who tested below the 25th percentile on a standardized aptitude/achievement exam, those who had secondary grades lower than a 2.0 GPA on a 4.0 scale, those who do not have minimum academic competencies or are carrying less than a 2.0 grade in an occupational program or job training course, those who have multiple withdrawals from prerequisites for occupational or job training, those who have been referred by faculty or staff as needing services in order to succeed, and those who have self-determined the need for services in order to succeed.		
Students in Kentucky Tech's vocational-technical schools are defined as LEP if they receive special LEP services or if they self-reported LEP status on the student profile sheet, one of the enrollment intake forms.	LEP individuals are defined by section 703 (a) (1) of the Elementary and Secondary Education Act of 1965.		

Issues	California	Colorado	Idaho
d. **Handicapped/ disabled**	Student disabilities must be verified through a state office. However, the state excludes psychological disabilities and substance abuse from the federal definition. State-level administrators were not sure whether institutions included the two state-excluded disabilities in their definitions for vocational data reporting.	Handicapped/disabled students are broken down into eleven categories and identified only when they seek services for their disability. Even entering students who have been identified at the secondary level as disabled are not counted at the postsecondary level as such.	See the definition under secondary education.
e. **Single parents and displaced homemakers**	State-level administrators stated that some institutions do not identify single parents. However, data were maintained by the institutions for all participants in the New Horizons/Sex Equity programs for single parents, displaced homemakers, and nontraditional students. Standard data were collected based on a state-developed Program Accountability Model.	Unless a student seeks services for, and self-identifies as, a single parent, there is no identification of the student as such.	See the definition under secondary education.
8. **Followup procedures**	CCC does not collect any aggregate follow-up data. Instead, local institutions and districts determine whether to conduct a follow-up survey. However, CCC did sponsor the development of a standard two-part survey form that was first used in the spring of 1992. The classroom part of the survey was given to all advanced occupational students (those with SAM codes B and C) in the spring semester, and then the follow-up part was sent to the same students six months after they left school.	Students are followed up a year after completing their program, although this varies somewhat because not all students finish their program at the same time in the school year. The community colleges have a standard follow-up phone survey performed by teachers. The community college visited had approximately a sixty to sixty-five percent response rate. In addition, an employer satisfaction survey is performed.	The procedure is similar to follow-up at the secondary level. However, at the postsecondary level, the follow-up data is recorded separately by race-ethnicity, special need, and type of award at completion.

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KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Handicapped/disabled status is determined by self-identification on intake forms, from outside agency referrals, and/or upon the request for special handicapped/disabled services.	Students considered to be handicapped or disabled are those with a history of physical or mental impairment limiting major life activities, or those deemed disabled according to part B of the Individuals with Disabilities Education Act, or those designated as disabled under section 504 of the Rehabilitation Act of 1973.		
Single parent and displaced homemaker status is determined by self-identification on the confidential entering student survey used by universities and community colleges, or on Kentucky Tech's vocational–technical schools intake form.	An individual who is unmarried or legally separated and has custody or joint custody of one or more children is designated a single parent. Displaced homemakers include adults who have primarily worked without remuneration caring for the home and children and therefore have no marketable skills, adults who have been reliant on public assistance or family support no longer available, adults whose youngest child has reached the age that will make them ineligible for AFDC, and adults who are having troubles obtaining employment. For the most part, Michigan is able to provide up-to-date student demographic and special needs information because the state assesses these characteristics at matriculation. However, it is not clear if accurate information for first-year students regarding LEP and disadvantaged status is available until aptitude tests are conducted.		
Completers and, if approved, their employers, are followed up six months after they graduate or complete their program. Completers in Kentucky Tech's vocational–technical schools are also followed up two years after completion. Postsecondary institutions (community colleges and regional universities) used to conduct a two- and five-year follow-up and now only conduct a three-year follow-up. The community college visited is conducting a five- and a ten-year follow-up on its own.	Follow-up reports are conducted by each school for students who graduated from their programs in the preceding year. Only those who graduated the year prior are surveyed. These reports must be submitted within nine months of graduation. Follow-ups are conducted by program by gender and race-ethnicity. Schools may create their own survey format and hire out the work to an outside firm. The state does not require that employers be surveyed. All vocational students receive the same survey. The community college visited conducts many other follow-ups for its own programming purposes. The school conducts follow-ups to assess its success at training and preparing students for further academic and vocational attainment.	Graduate follow-ups are conducted regarding employment experience and employer satisfaction for those students that completed and received an associate degree in the prior year. All other students are excluded, including those students who received a certificate. CCRI reports an average of eighty percent response rate to this graduate survey. CCRI also conducts a follow-up on non-returning students. Targeted students include those who were enrolled full-time in the two prior semesters but did not return in the current year. The survey assesses students' reasons for not returning.	A recent study by the National Governors' Association found that in most states (seven of eleven postsecondary agencies responding to the survey) program followup is decentralized, being conducted by local institutions (Amico, 1993).

Issues	California	Colorado	Idaho
9. **Faculty information**	VSDS did not collect any faculty data. In contrast, MIS can currently produce a duplicated count of instructors based on a count of vocational course sections. In the future, MIS should be able to identify individual instructors based on social security numbers (or a unique district-assigned identifier), and be able to link them to courses and course sections.	There is no comprehensive database on education faculty at the postsecondary level.	Postsecondary institutions use the IPEDS faculty survey.

KENTUCKY	MICHIGAN	RHODE ISLAND	OTHER STATES
Postsecondary institutions under the University of Kentucky, which includes all the community colleges, have just begun to implement a comprehensive human resource system. This system makes no distinction between vocational and non-vocational teachers. Faculty information on Kentucky Tech's vocational-technical schools would need to be obtained directly from the personnel files kept at the state level.	Michigan collects information on full-time faculty through its annual Full-Time Instructional Faculty Report. Information is collected regarding the following: salaries, tenure, fringe benefits, contract length, sex, and academic rank. These data are collected on October 1 each year. However, these are aggregate numbers regarding faculty, and are not broken down according to programs or departments.	The college keeps computerized faculty data about credentials, years of experience at the college, and program teaching assignment by CIP code. Additionally, the college maintains hard copies of resumes, work histories, contract information, wages, and other similar data.	

APPENDIX C

LIST OF MEETING PARTICIPANTS

List of Participants in the Professional Working Group Meetings

Lorraine Amico, National Governors Association
Rick Apling, Congressional Research Service
Charles Benson, National Center for Research in Vocational Education
Glenn Boerrigter, Office of Vocational and Adult Education
Dave Boesel, National Assessment of Vocational Education
Elise Brand, Computer Business Methods, Inc.
Don Brannon, North Carolina Department of Education
Cynthia Brown, Office of Management and Budget
Ida Bryant, Office of Vocational and Adult Education
Charles Buzzell, American Vocational Association
Joe Cassello, Office of Vocational and Adult Education
Dan Chenok, Office of Management and Budget
Barbara Clements, Council of Chief State School Officers
Woody Cox, Future Farmers of America Alumni Association
Pat Dabs, National Center for Education Statistics
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Carol Davis, American Indian Higher Education Consortium
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David Stevens, University of Maryland
Roseanne White, Technology Students Association
John Wirt, Department of Labor
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List of Participants in the Series of National Meetings

Representatives of Tribal Agencies

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Robert Amato, American Indian Higher Education Consortium
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Robert L. Goombi, Haskell Indian Junior College, KS
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Linda West, George Washington University

Representatives of Vocational Student Organizations

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Ed Davis, Distributive Education Clubs of America
Robert Graham, National Vocational Agriculture Teachers Association
Coleman Harris, National Future Farmers of America Organization
Alan Rains, Future Homemakers of America
Roseanne White, Technology Students Association